January 1978 Number 401-Part I

STACKS

Solar-Geophysical Data prompt reports

Data for December 1977–November 1977

Explanation of Data Reports Issued as Number 390 (Supplement) February 1977

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Solar - Geophysical Data

NO. 401 JANUARY 1978

Part I (Prompt Reports)

DATA FOR
DECEMBER 1977
NOVEMBER 1977

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

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SOLAR-GEOPHYSICAL DATA

No. 401

Issued in two parts

Helen E. Coffey, Editor

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Solar-Terrestrial Data Services Division

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"391A 34" listed under 1977 Jan means that data for January 1977 were contained in *Solar-Geophysical Data* Number 391 - Part I, beginning on page 34.

A = Part I, B = Part II.

----- = no data available.
blank = data not yet received.

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ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

DECEMBER 1977

PRESTO MESSAGES (THE RAPID REPORT OF MAJOR EVENTS)

BOULDER 06/2100Z SOFLARE SB/M4 S18W09 06/1933 DURATION 17 MINUTES TENFLARE 120 FLUX UNITS 06/1933Z DURATION 04 MINUTES
BOULDER 10/1639Z SOFLARE 1B/M7 S28E16 10/0305Z DURATION 22 MINUTES TENFLARE 130 FLUX UNITS 10/0305Z DURATION 37 MINUTES
BOULDER 11/1400Z WEAK MAGSTORM IN PROGRESS 11/1130Z
BOULDER 30/0500Z SOFLARE 1N/M4 S20E30 30/0410Z 10 MINUTES TENFLARE 300 FLUX UNITS 30/0408Z 07 MINUTES

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
335	1	30	16	88	07	S22E71	1	0	0		30	S22E71	Q	SOLQUIET MAGQUIET
336	2	01	32	91	08	N18E03	2	0	0		1	N18E03	Q	SOLALERT 02/XX MAGQUIET
						S19E54	9	0	0			S19E54	A	
337	3	02	19	94	37	S19E38	2	0	0		2	S19E38	Q	SOLNIL MAGALERT MINOR 03/03
338	4	03	50	97	08	N18W24	0	0	0		3	N18W24	Q	SOLQUIET MAGNIL
						S20E25	0	0	0			S20E25	Q	
						N17W61	3	0	0			N17W61	Q	
339	5	04	63	99	08	N15W35	0	0	0		4	N15W35	Q	SOLQUIET MAGQUIET
						S20E16	3	0	0			S20E16	Q	
						N18W71	2	0	0			N18W71	Q	
						N16W09	0	0	0			N16W09	Q	
340	6	05	84	100	15	N17W50	3	0	0		5	N17W50	Q	SOLQUIET MAGQUIET
						S20E00	9	0	0			S20E00	Q	
						N17W23	0	0	0			N17W23	Q	
						S27E74	2	0	0			S27E74	Q	
						S28E14	0	0	0			S28E14	Q	
341	7	06	79	109	04	N16W62	4	0	0	TENFLARE 06/1933Z	6	N16W62	E	SOLQUIET MAGQUIET
						S21W12	5	1	0	120 FLUX UNITS		S21W12	E	
						N16W36	0	0	0	(S18W09)		N16W36	Q	
						S26E55	4	0	0			S26E55	E	
						S18W34	0	0	0			S18W34	Q	
342	8	07	77	109	02	N16W74	5	0	0		7	N16W74	E	SOLALERT 08/XX MAGALERT MINOR 09/10
						S20W25	5	0	0			S20W25	A	
						N15W51	0	0	0			N15W51	Q	
						S26E42	8	2	0			S26E42	A	
						S18W48	0	0	0			S18W48	Q	
343	9	08	98	110	02	N16W89	0	0	0		8	N16W89	Q	SOLALERT 09/XX MAGALERT 09/12
						S21W40	0	0	0			S21W40	E	
						S26E31	4	0	0			S26E31	E	
						N25E72	6	0	0			N25E72	A	
344	10	09	151	117	03	S22W54	1	0	0		9	S22W54	E	SOLALERT 10/XX MAGALERT 10/12
						S27E15	17	0	0			S27E15	E	
						N25E61	5	0	0			N25E61	A	
						S19W42	0	0	0			S19W42	Q	
						N01W12	0	0	0			N01W12	Q	
345	11	10	205	118	03	S22W67	2	0	0	TENFLARE 10/0706Z	10	S22W67	E	SOLALERT 11/XX MAGALERT MINOR 11/13
						S26E01	9	2	0	160 FLUX UNITS		S26E01	A	
						N26E47	0	0	0	(S28E16)		N26E47	Q	
						S18W55	0	0	0			S18W55	Q	
						N01W24	2	0	0			N01W24	E	
						S21E68	0	0	0			S21E68	Q	
346	12	11	145	111	33	S21W77	0	0	0	MAGSTORM 11/0900Z	11	S21W77	Q	SOLALERT MAGALERT
						S24W11	7	1	0	A MINOR MAGSTORM		S24W11	E	
						N25E34	0	0	0	WAS IN PROGRESS		N25E34	Q	
						S22E54	0	0	0	0900-1500Z		S22E54	Q	
						S16W64	0	0	0			S16W64	Q	
						N17E75	0	0	0			N17E75	Q	
						N02W34	0	0	0			N02W34	Q	
347	13	12	114	114	15	N24E20	0	0	0		12	N24E20	Q	SOLALERT 13/15 MAGALERT 13/14
						S18W79	0	0	0			S18W79	Q	
						S23E39	0	0	0			S23E39	Q	
						N19E59	0	0	0			N19E59	Q	
						S21W86	15	1	0			S21W86	A	
						N25E24	0	0	0			N25E24	Q	
348	14	13	79	104	10	S27W39	6	0	0		13	S27W39	E	SOLNIL MAGNIL
						N24E08	0	0	0			N24E08	Q	
						N15E50	0	0	0			N15E50	Q	
						S25E12	0	0	0			S25E12	Q	
349	15	14	62	98	06	S27W53	1	0	0		14	S27W53	Q	SOLQUIET MAGQUIET
						N25W04	1	0	0			N25W04	Q	
						N15E35	0	0	0			N15E35	Q	
						S23W00	0	0	0			S23W00	Q	
350	16	15	46	94	07	S26W66	0	0	0		15	S26W66	Q	SOLQUIET MAGQUIET
						N26W19	1	0	0			N26W19	Q	
						S22E11	0	0	0			S22E11	Q	
						N18E18	1	0	0			N18E18	Q	
						S28E14	0	0	0			S28E14	Q	
351	17	16	93	96	09	S24W86	0	0	0		16	S24W86	Q	SOLQUIET MAGQUIET
						N25W34	0	0	0			N25W34	Q	
						N18E11	0	0	0			N18E11	Q	
						S22W02	0	0	0			S22W02	Q	
						S27E02	0	0	0			S27E02	Q	
						N16E20	0	0	0			N16E20	Q	
						S12E34	0	0	0			S12E34	Q	

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QUALITY CONTROL MARK 2

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

DECEMBER 1977

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions				Outstanding events	Forecasts			Alert Situations
						Location	No. of Flares				Date	Location	Desc*	
						Lat-Long	Total	M	X			Lat-Long		
352	18	17	51	94	09	S22W15	0	0	0		17	S22W15	Q	SOLQUIET MAGQUIET
						N15E05	0	0	0			N15E05	Q	
						S12E21	0	0	0			S12E21	Q	
						N23E82	1	0	0			N23E82	Q	
353	19	18	44	97	03	N18W15	0	0	0		18	N18W15	Q	SOLQUIET MAGQUIET
						S24W29	0	0	0			S24W29	Q	
						N21E68	0	0	0			N21E68	Q	
354	20	19	50	94	03	N17W31	1	0	0		19	N17W31	Q	SOLQUIET MAGQUIET
						S24W38	0	0	0			S24W38	Q	
						N23E53	1	0	0			N23E53	Q	
						N19W02	0	0	0			N19W02	Q	
355	21	20	40	92	05	N16W28	0	0	0		20	N16W28	Q	SOLQUIET MAGQUIET
						N23E40	0	0	0			N23E40	Q	
						S26E09	0	0	0			S26E09	Q	
356	22	21	32	91	04	N15W52	0	0	0		21	N15W52	Q	SOLQUIET MAGQUIET
						N22E27	0	0	0			N22E27	Q	
357	23	22	40	93	02	N15W57	0	0	0		22	N15W57	Q	SOLQUIET MAGQUIET
						N22E14	0	0	0			N22E14	Q	
						S28W17	0	0	0			S28W17	Q	
358	24	23	42	94	03	N22E01	0	0	0		23	N22E01	Q	SOLQUIET MAGQUIET
						S28W31	0	0	0			S28W31	Q	
						N18E74	0	0	0			N18E74	Q	
359	25	24	54	97	04	N22W11	2	0	0		24	N22W11	Q	SOLQUIET MAGQUIET
						S28W45	3	0	0			S28W45	E	
						N20E63	0	0	0			N20E63	Q	
360	26	25	53	100	05	N23W24	0	0	0		25	N23W24	Q	SOLQUIET MAGQUIET
						S27W56	5	0	0			S27W56	E	
						N19W45	0	0	0			N19W45	Q	
361	27	26	63	103	08	N23W40	1	0	0	REGION 967 WHICH IS	26	N23W40	Q	SOLALERT MINOR 27/XX MAGALERT MINOR
						S26W67	7	1	0	JUST COMING OVER		S26W67	E	27/29
						N21E31	0	0	0	EAST LIMB HAS PRO-		N21E31	Q	
						S27W07	0	0	0	DUCED TWO M X-RAY		S27W07	Q	
						N21E49	0	0	0	EVENTS ON 26 DECEM-		N21E49	Q	
										BER				
362	28	27	68	102	05	N23W54	0	0	0		27	N23W54	Q	SOLALERT MINOR 28/XX MAGALERT MINOR
						S26W83	6	2	0			S26W83	E	28/29
						N21E18	0	0	0			N21E18	Q	
						S17E67	6	0	0			S16E67	E	
						N21E34	1	0	0			N21E34	Q	
363	29	28	62	102	09	N22W67	0	0	0		28	N22W67	Q	SOLNIL MAGALERT 29/31
						N19E05	0	0	0			N19E05	Q	
						S17E54	6	1	0			S17E54	E	
						N21E19	0	0	0			N21E19	Q	
						S16E80	0	0	0			S16E80	Q	
364	30	29	122	112	08	N23W81	1	0	0		29	N23W81	Q	SOLQUIET MAGNIL
						N19W06	0	0	0			N19W06	E	
						N21E08	2	0	0			N21E08	E	
						S18E44	2	1	0			S18E44	E	
						S17E71	6	2	0			S17E71	E	
365	31	30	153	119	03	S22W43	0	0	0		30	S22W43	Q	SOLQUIET MAGQUIET
						N21W16	0	0	0			N21W16	Q	
						N21W04	1	0	0			N21W04	E	
						S18E31	5	2	0			S18E31	E	
						S17E56	3	0	0			S17E56	E	
001	01	31	178	124	04	N20W29	0	0	0		31	N20W29	Q	SOLALERT 01/XX MAGQUIET
						S18E17	1	0	0			S18E17	A	
						N20W17	2	0	0			N20W17	E	
						S17E42	5	1	0			S17E42	E	

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare

RELATIVE SUNSPOT NUMBERS

ZURICH, R_Z

1977 PROVISIONAL

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	20	15	0	7	15	44	42	17	22	45	44	20
2	32	19	0	11	14	43	45	15	29	31	42	15
3	25	19	8	10	22	43	42	24	29	46	22	31
4	22	16	8	7	23	49	39	19	25	45	21	47
5	21	18	8	7	16	48	48	23	20	38	20	62
6	13	7	9	8	16	33	40	26	26	47	23	58
7	0	7	8	7	12	41	25	28	25	54	34	55
8	0	26	20	0	19	38	20	25	18	49	25	36
9	0	21	20	0	25	33	17	30	30	45	31	55
10	0	23	19	0	29	29	23	25	40	36	25	75
11	14	25	19	8	34	27	9	23	45	23	25	71
12	19	48	9	12	35	22	8	29	51	27	24	53
13	23	68	8	16	26	20	10	40	48	53	28	34
14	22	61	7	22	33	25	7	40	47	45	24	32
15	20	45	0	34	26	8	0	42	53	48	33	44
16	18	49	0	33	21	8	0	38	56	53	41	46
17	30	44	0	32	20	8	0	36	53	50	46	26
18	26	37	0	29	12	21	0	40	59	50	50	24
19	7	25	0	22	0	36	7	35	58	46	51	39
20	0	18	0	12	11	21	8	30	58	53	31	23
21	15	9	0	20	14	26	8	32	59	38	26	23
22	24	9	10	19	7	40	23	42	42	35	26	17
23	34	9	8	18	7	57	30	15	41	25	20	23
24	35	8	7	8	7	60	45	19	48	31	15	25
25	17	8	14	0	8	74	38	25	46	23	8	30
26	8	8	8	14	7	71	41	34	49	29	7	36
27	0	0	9	8	13	74	34	38	54	40	14	50
28	13	0	16	16	16	65	26	36	61	35	7	38
29	11		8	9	20	58	15	36	63	39	18	58
30	8		8	8	30	45	8	32	67	43	24	78
31	10		8		40		7	31		51		61
MEAN	15.7	22.6	8.0	13.2	18.4	38.4	21.2	29.9	44.1	41.3	26.6	41.3

1976 yearly mean = 12.6

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

1977

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	73.8	81.7*	72.6	74.8	77.2	88.9	102.0	83.0*	83.1	93.8*	94.4	88.4
2	76.5	82.1	75.4	76.3	78.5	90.9*	100.7	82.8	84.2	93.2	93.6	91.2
3	76.8	88.9	74.8	76.6	81.9	93.0*	97.4	82.3	87.2	97.4	90.4	93.7
4	75.5	78.7	76.9	76.8	81.4*	94.2	94.0	82.9*	84.2	98.8	89.4	95.9
5	74.8	77.8	77.6	75.5	79.6	90.2*	88.0*	86.4	85.6	104.0*	90.6	96.9
6	72.4	75.2	77.6	76.1	78.5	90.6	90.2	88.2	84.9	103.5	91.1	102.0*
7	71.4	74.6	77.2	75.5*	77.1*	92.0	85.2	86.9	89.3	105.5	90.2	105.5
8	69.6	78.6	81.6	74.3	77.9	91.9*	82.1	85.1	91.6	103.8	90.3	106.7
9	68.4	83.1	80.3	74.8	83.6	90.9	79.0	85.9	95.9	100.7	91.1	112.6*
10	68.8	83.5	80.5	76.5	80.8	89.2*	76.9	87.2	99.8	96.4	93.1	114.7
11	71.2	84.6	78.9	79.2	80.8	87.2	76.2	87.6	104.6	95.3	94.9	107.4
12	74.9	86.9*	78.6	80.2	79.7	83.3	75.6	86.5	107.8	100.8	91.4	111.0
13	77.5	88.5	77.9	82.7	81.5	84.2	77.8	89.0	112.9	98.5	94.0	100.6
14	74.5	85.2	77.2	83.4	84.8	82.3	76.8	87.5	118.2	98.9	97.9	93.7*
15	75.6	84.4	74.8	86.8	85.0	82.3	76.0	86.9	120.7	98.2	97.9	92.5
16	77.5	85.7	74.1	83.7	85.1	81.4	76.9	87.3	120.4	96.8	95.9	92.5
17	76.1	89.6*	74.1	83.6	84.1	82.4	76.5	87.1	120.6	94.9	100.4	91.1
18	75.4	86.5	73.9	80.8	82.9	84.3	76.9	88.6	120.5	95.4	102.8*	93.6
19	76.9	82.8	74.0	79.8*	82.1	85.2	76.9	87.0	104.5	105.0	99.2	91.0
20	75.2	81.1	72.3	80.4*	81.3	88.9	80.1	88.7	108.8	99.6*	95.7*	88.7
21	74.8	78.6	72.8	80.8	81.4	92.4	81.7	90.8	104.9*	98.6*	92.8	87.8
22	76.8	75.9	74.6	80.1	82.9	98.8*	83.1	89.6	102.4	93.9	89.3	89.9
23	78.7	75.9	74.7	77.5	82.4	99.4	85.0	86.0	99.3	87.3	88.0	91.2
24	77.4	74.2	74.8	76.5	79.2	107.4	84.0	86.0	100.6	88.3	86.7	93.9
25	74.9	74.3	74.0	76.4	77.4	113.8	86.0	87.7	98.8	88.1	84.7	96.3
26	76.0	72.3	75.1	75.4	76.8	120.7	86.0	86.4	99.4	88.6	84.1	99.3
27	75.3	72.8	74.5	74.9	77.9	115.9*	85.4	85.4	100.0	88.5	83.8	98.3
28	77.1	72.6	74.4	74.2	79.1	113.4	87.5	82.4	100.0	90.3*	85.6	98.9
29	76.1		75.4	74.8	81.7	111.9	86.7	86.1	99.4	90.3	85.6	105.6*
30	76.3		74.6	76.6	89.9	106.9	84.1	85.5	97.7	94.9	85.3	114.7
31	79.6		74.1		92.0		80.4	84.7		95.9		120.2
MEAN	74.9	80.3	75.8	78.2	81.4	94.5	83.7	86.4	100.9	96.3	91.6	98.9

* adjusted for burst

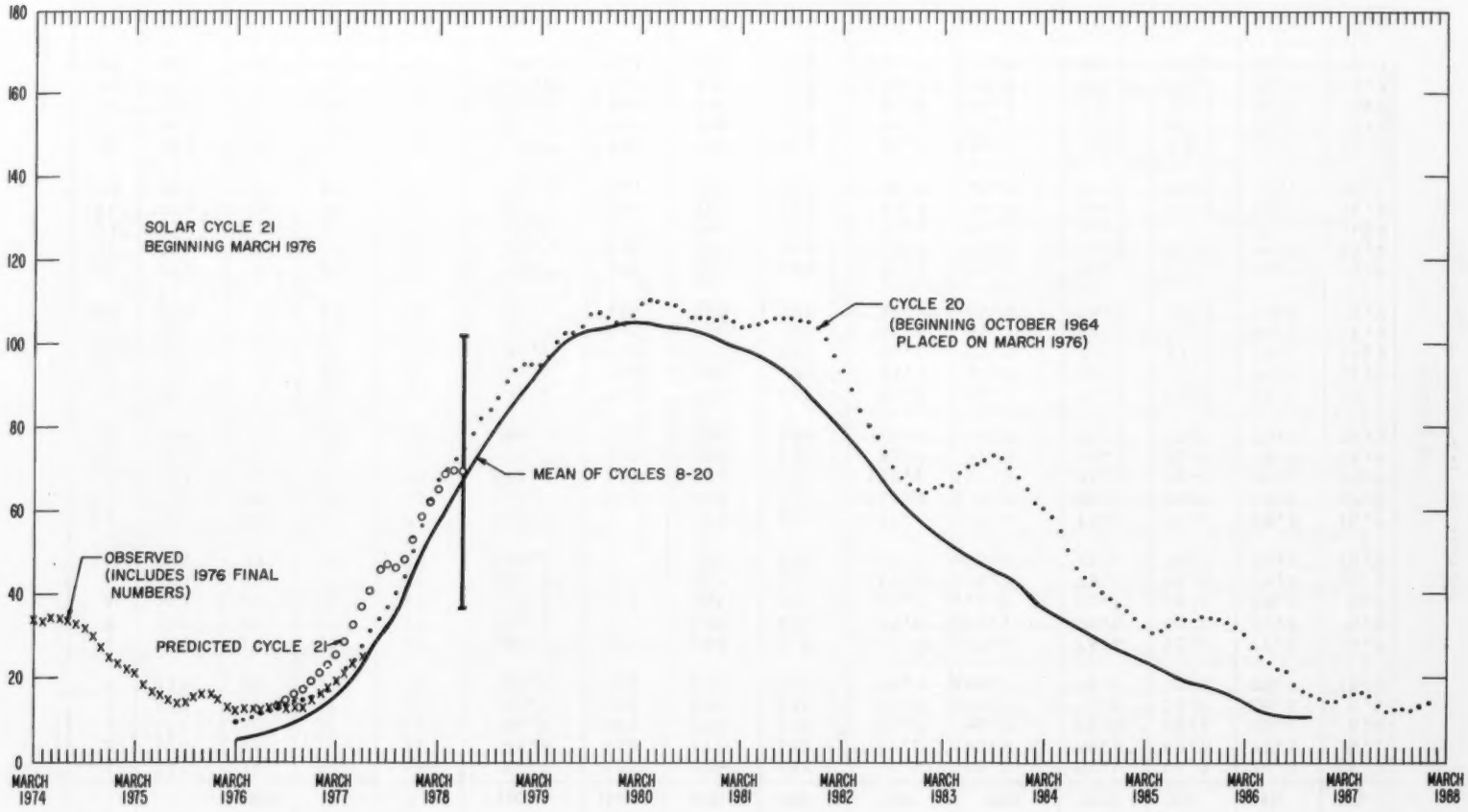
DAILY SOLAR INDICES

DECEMBER 1977

DEC 1977	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS		OBSERVED FLUX	SOLAR FLUX ADJUSTED TO 1 A.U.								
			R_Z	$R_{A'}$	OTTAWA 2800	AFGL 15400	AFGL 8800	AFGL 4995	OTTAWA 2800	AFGL 2695	AFGL 1415	AFGL 606	AFGL 410	AFGL 245
1	335	14	20	18	90.9	521	276	133	88.4	88.8	67.0	46.4	24.9	11.8
2	336	15	15	21	93.8	532	279	132	91.2	96.4	69.3	49.8	28.3	9.1
3	337	16	31	29	96.5	529	278	132	93.7	96.9	72.9	49.8	25.4	8.4
4	338	17	47	46	98.8	532	289	134	95.9	101.5	71.7	52.7	26.3	8.6
5	339	18	62	56	99.8	532	292	140	96.9	106.0	75.4	51.8	26.4	11.0
6	340	19	58	55	105.0*	535	299	145	102.0*	107.6	78.6	52.2	27.5	10.7
7	341	20	55	57	108.8		305	155	105.5	113.1	78.6	52.6	25.7	9.0
8	342	21	36	45	110.0	540	305	143	106.7	111.7	78.7	52.2	29.3	9.7
9	343	22	55	58	116.1*	541	310	152	112.6*	116.2	79.5	54.0	29.3	12.0
10	344	23	75	83	118.2		320	156	114.7	123.2	81.8	58.3	32.1	18.9
11	345	24	71	73	110.8		310	148	107.4	117.4	79.4	58.2	29.0	14.7
12	346	25	53	65	114.5	542	313	149	111.0	119.7	86.7	58.5	31.4	13.5
13	347	26	34	50	103.8	533	291	136	100.6	107.4	80.8	56.6	26.2	11.9
14	348	27	32	39	96.7*	531	299	132	93.7*	97.5	85.2	52.4	25.7	11.0
15	349	1	44	38	95.5	533	284	128	92.5	94.0	72.4	52.5	26.6	10.3
16	350	2	46	33	95.6	540	286	130	92.5	94.4	71.2	50.9	27.1	10.7
17	351	3	26	22	94.1	548	292	134	91.1	96.5	69.2	52.8	25.6	10.2
18	352	4	28	34	96.7	543	278	133	93.6	97.5	72.3	52.6	27.7	11.5
19	353	5	39	40	94.0	538	286	127	91.0	91.3	65.2	49.1	24.9	10.4
20	354	6	23	18	91.6	534	280	127	88.7	89.9	65.9	50.8	24.4	9.2
21	355	7	23	22	90.7	535	281	128	87.8	84.4	64.7	50.0	24.8	9.5
22	356	8	17	21	92.9	536	290	128	89.9	91.7	64.4	50.1	44.0	15.2
23	357	9	23	20	94.3	537	284	130	91.2	93.8	64.9		22.9	14.9
24	358	10	25	31	97.1	537	286	131	93.9	96.6	64.4	49.9	28.6	16.0
25	359	11	30	32	99.6	541	290	135	96.3	99.1	70.0	49.6	27.9	10.1
26	360	12	36	43	102.7	550	298	141	99.3	104.6	70.6	53.1	23.4	11.1
27	361	13	50	49	101.7	547	294	136	98.3	102.1	70.6	49.0	24.5	9.6
28	362	14	38	41	102.3	547	297	142	98.9	106.2	69.6	52.1	21.5	8.5
29	363	15	58	62	109.2*	553	302	149	105.6*	115.8	77.0	52.7	24.9	8.8
30	364	16	70	58	118.6	548	294	150	114.7	114.9	80.0	53.1	26.4	8.8
31	365	17	61	69	124.3		302	158	120.2	128.6	80.2	55.0	27.9	9.5
MEAN			41.3	42.8	102.1	538	293	139	98.9	103.4	73.5	52.3	27.1	11.1

* Adjusted for burst.

Note: Data gaps in AFGL Sagamore Hill are due to equipment problems.



PREDICTED AND OBSERVED SUNSPOT NUMBERS

SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
CYCLE 21

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1976	15.2	13.2	12.2	12.6	12.5	12.2	12.9	13.9	14.1	13.3	13.3	14.7
1977	16.6	17.9	19.8	21.9	23.7	25.6	28.7 (2)	32.0 (5)	35.3 (7)	39.0 (10)	43.1 (12)	47.3 (14)
1978	51.4 (17)	55.9 (20)	60.2 (23)	63.7 (26)	66.9 (30)	70.0 (33)	73.0 (33)	76.5 (32)	80.5 (32)	83.8 (32)	87.0 (32)	90.0 (34)
1979	92.6 (35)	94.9 (36)	97.6 (39)	100.5 (40)	102.7 (41)	104.2 (44)	105.2 (46)	105.9 (49)	106.2 (51)	106.6 (51)	107.1 (51)	107.8 (49)
1980	108.6 (50)	108.4 (51)	107.6 (51)	106.9 (52)	106.4 (52)	106.2 (51)	106.0 (51)	105.6 (52)	105.4 (54)	105.2 (55)	104.4 (55)	103.0 (54)
1981	101.6 (52)	100.8 (51)	99.8 (50)	98.9 (48)	98.2 (46)	97.3 (45)	96.4 (45)	94.9 (43)	93.0 (41)	91.0 (39)	88.7 (38)	86.3 (37)
1982	84.2 (36)	82.2 (34)	80.0 (33)	77.3 (32)	74.4 (30)	72.1 (27)	69.5 (24)	67.4 (23)	64.7 (22)	61.7 (21)	59.6 (21)	58.2 (21)
1983	56.7 (22)	55.1 (21)	53.4 (22)	52.1 (23)	50.8 (24)	49.4 (26)	48.0 (27)	46.7 (29)	45.9 (29)	44.9 (29)	43.7 (28)	41.9 (27)
1984	39.8 (27)	37.8 (28)	36.5 (29)	35.5 (30)	34.2 (29)	32.3 (29)	31.9 (27)	30.9 (26)	29.6 (26)	28.4 (25)	27.1 (25)	26.1 (25)
1985	25.3 (25)	24.6 (24)	23.7 (23)	22.7 (22)	21.7 (21)	20.9 (21)	19.9 (22)	18.8 (22)	18.1 (23)	17.9 (23)	17.4 (23)	16.6 (22)
1986	15.6 (21)	14.6 (20)	13.7 (19)	12.8 (18)	12.0 (17)	11.6 (16)	11.2 (15)	11.1 (14)	10.9 (12)	10.7 (11)	10.8 (10)	11.1 (10)
1987	11.6 (11)	12.2 (12)	12.7 (12)	13.3 (13)	14.0 (14)							

For each month, the upper figure is the observed or predicted Zürich smoothed sunspot number. The lower figure in parenthesis is the corresponding absolute value of the 90% prediction interval, an indication of the uncertainty above and below the predicted number. Observed numbers are those with no prediction intervals. The observed smoothed sunspot numbers are based on final Zürich numbers through 1976.

The predicted sunspot numbers are derived from a regression analysis based on cycles 8 through 20. Tests indicate that earlier cycles are from a different statistical population.

The table above assumes March 1976 as the minimum of solar cycle 20. The Office of Telecommunications is preparing similar predictions, using June 1976 as the observed minimum. Until the 1977 Zürich final relative sunspot numbers are available, either March or June 1976 is possible as the observed sunspot minimum.

Hα SOLAR FLARES

DECEMBER 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
					APPROX.		CENTRAL	MOUNT PLAGE	CMP								
	DATE DEC	START	MAX. PHASE	END	LAT.	MER. DIST.	DISTANCE	REGION	DAY	MIN.		CORO.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
HTPR	02	0935	0940	0945	S24	E55	.824		6.5	10	SF		C	0940	30		E
HTPR	02	1056	1102	1109	S24	E54	.815		6.5	13	SF		C	1102	30		E
HTPR	02	1109	1112	1114	S22	E44	.709		5.8	5	SF		C	1112	10		
MONT	02	1139	1142	1147	S22	E59	.856		6.9	8	SF		C	1142	20		D
HTPR	02	1140	1143	1147	S24	E54	.815		6.5	7	SN		C	1143	50		
HTPR	02	1355	1358	1402	S24	E53	.806		6.6	7	SF		C	1358	20		
HTPR	02	1356	1359	1410	S19	E54	.808		6.6	14	SF		C	1359	20		
HTPR	02	1412	1418	1422	S24	E51	.787		6.4	10	SF		C	1418	60		
HTPR	02	1428	1431	1439	S27	E55	.829		6.7	11	SF		C	1431	20		
HTPR	03	1057	1058	1104	S18	E37	.614		6.2	7	SF		C	1058	20		
HTPR	03	1325	1330	1336	N08	W10	.302		2.8	11	SF		C	1330	10		
HTPR	03	1434	1440	1510	N17	E47	.788		7.1	36	SN		C	1453	40		EGK
HTPR	03	1434	1453	1510	N17	E47	.788		7.1	36	SN		C	1453			
MCMA	03	1806	1807	1826	S19	E33	.566	15049	6.2	20	SF		C	1807	40		E
PALE	04	0133	0144	0146D	N12	W60	.886		30.6	130	SF	3	V		45		DE F
HTPR	04	0801E		0823D	N15	W65	.926		30.5	220	SF		C	0826	20		
HTPR	04	1011	1015	1030	S22	E23	.456		6.1	19	SF		C	1015	20		E
HTPR	04	1122	1123	1130	S07	E12	.207		5.4	8	SF		C	1123	30		E
HTPR	04	1351	1357	1406D	S24	E26	.508		6.5	150	SN		C	1357	30		
MCMA	04	1625	1627	1633	S07	E14	.241	15047	5.7	8	SN		C	1627	40		D
HTPR	05	0915	0922	0929	S24	E86	.994		11.8	14	SF		C	0918	20		
HTPR	05	1223	1224	1230	N18	W17	.493		4.2	7	SF		C	1224	40		E
MONT	05	1225	1228	1238	N17	W16	.472		4.3	13	SN		C	1228	60		E
RAMY	05	1507E	1508U	1514	S18	E 6	.226		6.1	70	SF	3	C		127		F
RAMY	05	1558E	1601	1609	S24	E78	.972		11.5	110	SF	3	C		0		DE
RAMY	05	1640E	1642	1648D	S16	E 1	.169		5.8	80	SN	3	C		95		DE
PALE	05	1805	1810	1827	S20	E14	.330		6.8	22	SF	3	C		39		F U
PALE	05	1805	1810	1827	S20	E 4	.246		6.1	22	SF	3	V		39		FDE
PALE	05	1946	1948	1958	N17	W48	.797		2.2	12	SF	3	V		18		DE
PALE	05	1946	1948	1958	N17	W48	.797		2.2	12	SF	3	C		18		DE
PALE	06	0110E	0113	0121	N17	W51	.824		2.2	110	SF	3	V		25		F
PALE	06	0146	0146	0152	S21	W 0	.254		6.1	6	SF	3	V		38		DE
PALE	06	0206	0210	0216	S26	E71	.941		11.4	10	SF	3	V		18		DE
PALE	06	0235	0235	0251	S21	W 0	.254		6.1	16	SF	3	V		24		F
BUCA	06	0845		0905	S25	E65	.904		11.2	20	SN		C	0849	53	1.5	D
RAMY	06	1243E	1245	1252	S27	E64	.899		11.3	90	SN	4	C		30		DE
HTPR	06	1254	1256	1306	S27	E65	.906		11.4	12	SF		C	1256	20		
HTPR	06	1312	1316	1335	S20	W04	.247		6.3	23	SF		C	1316	30		E
HTPR	06	1352	1352	1358	S27	E64	.899		11.4	6	SN		C	1352	40		
HTPR	06	1412	1415	1427	S19	W05	.236		6.2	15	SN		C	1415	60		E
RAMY	06	1651E	1653	1657D	S20	W11	.299		5.9	60	SN	3	C		79		DE
RAMY	06	1743E	1744	1750D	N17	W59	.889		2.3	70	SN	4	C		64		DE
RAMY	06	1935E	1938	1945D	S18	W18	.360		5.5	100	SB	2	C		190		DE
PALE	07	0124	0124U	0126D	S27	E42	.707		10.2	20	SF	3	C		75		DE F
PALE	07	0155	0155	0256	S27	E42	.707	15056	10.2	61	1N	3	C		312		U F
MONT	07	1040	1045	1053D	N16	W68	.945		2.3	130	SF		C	1045	20		D
WEND	07	1208		1225	S25	E52	.800	15056	11.4	17	1N		V		300		
MONT	07	1211E	1214	1223D	S25	E54	.818	15056	11.6	120	1N		C	1214	250		
RAMY	07	1540E	1548	1602	S25	E45	.731	15056	11.0	220	1N	2	C		190		F
PALE	07	1757E	1759U	1821	S27	E46	.747	15056	11.2	240	2N	3	C		476		F
PALE	07	1826	1830	1847	S27	E46	.747	15056	11.2	21	1F	3	C		183		FDE
MCMA	07	1827E		1859D	S27	E48	.767	15056	11.4	320	SN		P	1827	100		
PALE	07	1849	1905	1934D	S27	E46	.747	15056	11.2	450	1N	3	C		224		FDE
PALE	07	1905	1907	1916	N15	W73	.968		2.3	11	SF	3	V		63		DE
PALE	07	1905	1907	1916	N15	W73	.968		2.3	11	SF	3	C		63		DE
RAMY	07	1910E	1910U	1916	N14	W72	.962		2.4	60	SN	2	C		0		F
MCMA	07	1940E		1955D	S27	E50	.786	15056	11.6	150	SN		P	1940	50		E
RAMY	07	1945E	1947	1959	N15	W70	.954		2.6	140	SN	3	C		0		H
MCMA	07	1946E		1955D	N16	W73	.968	15044	2.3	90	SN		P	1946	30		E
RAMY	07	1951E	1953	2018	S18	W21	.401	15049	6.3	270	1B	3	C		222		F H
MCMA	07	1954E		2003D	S20	W22	.429	15049	6.2	90	SB		P	1955	100		E
PALE	07	2130	2150	0049	S27	E44	.727	15056	11.2	199	1N	3	C		334		U F

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Hα SOLAR FLARES

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE DEC	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		CORD.	TYPE	TIME UT	MEAS. AREA Millionths of Disk	CORR. AREA Sq. Deg.	
PALE	08	0124	0126U	0126D	S27	E42	.707		11.2	2D	SF	3	C		75		DE F
PALE	08	0155	0155	0256	S27	E42	.707	15056	11.2	61	1N	3	C		312		U F
PALE	08	0155	0155	0202D	S27	E42	.707	15056	11.2	7D	1N	3	V		222		DE F
RAMY	08	1812E	1815	1826	N26	E75	.983		14.4	16D	SN	3	C		0		H
PALE	08	2123	2125	2133	N23	E68	.954		14.0	10	SF	3	C		26		DE
PALE	08	2130	2150	0049	S27	E44	.728	15056	12.2	199	1N	3	C		334		U F
PALE	08	2248	2248	2304	N23	E68	.954		14.1	16	SF	3	V		22		F
PALE	08	2248	2248	2304	N23	E68	.954		14.1	16	SF	3	C		22		F
PALE	08	2312	2323	2349	N23	E67	.949		14.0	37	SF	3	C		22		F
PALE	08	2312	2323	2349	N23	E67	.949		14.0	37	SF	3	V		22		F
PALE	09	0009	0010	0014	N23	E67	.949		14.0	5	SF	3	V		20		FDE
PALE	09	0103	0107	0126	N23	E66	.944		14.0	23	SF	3	V		62		FDE
PALE	09	0136	0136	0139	S26	E27	.538		11.1	3	SF	3	V		44		F H
PALE	09	0212	0221	0317	S26	E26	.527		11.0	65	SF	3	V		43		FDE
PALE	09	0239	0241	0259	N23	E66	.944		14.1	20	SF	3	V		41		F H
RAMY	09	1137E	1141	1151	S26	E26	.527		11.4	14D	SN	3	C		32		F
RAMY	09	1448	1450	1502	S24	E17	.411		10.9	14	SN	3	C		48		
PALE	09	1747	1752	1801	N24	E60	.912		14.2	14	SF	3	C		13		DE
PALE	09	1813	1813	1817	S26	E18	.443		11.1	4	SF	3	C		36		F
PALE	09	1815	1831	1900	N24	E59	.905		14.2	45	SF	3	C		17		F
PALE	09	1857	1900	1908	S26	E18	.443		11.1	11	SF	3	C		34		FDE
PALE	09	1918	1919	1926	S26	E18	.443		11.2	8	SF	3	C		19		F
PALE	09	1939	2027	2050	S26	E17	.434	15056	11.1	71	1N	3	C		272		DE F
PALE	09	1939	1940	2050	S26	E17	.434		11.1	71	SF	3	C		134		DE F
RAMY	09	1950E	1950U	1958D	S26	E21	.474		11.4	8D	SF	3	C		120		
RAMY	09	2030	2032	2043	S26	E21	.474		11.4	13	SF	3	C		130		
PALE	10	0009	0011	0018	S27	E20	.475		11.5	9	SF	3	C		45		FDE
PALE	10	0030	0030	0033	S22	W52	.795		6.1	3	SF	3	C		44		F
PALE	10	0035	0038	0042D	N 1	W12	.240		9.1	7D	SN	3	C		35		FDE
RAMY	10	1712E	1715	1727D	S25	E 8	.350		11.3	15D	SB	4	C		120		
PALE	10	1721E	1744	1955	S26	E 4	.348	15056	11.0	154D	1N	3	C		203		DE F
PALE	10	2020	2028	2036	S26	E 4	.348		11.1	18	SF	3	C		42		DE
PALE	10	2157	2159	2201	S22	W64	.896		6.1	4	SF	3	C		46		DE
PALE	10	2207	2207	2217D	S22	W64	.896		6.1	10D	SN	3	C		68		DE
PALE	10	2336	2343	2344D	S27	E 7	.375		11.5	8D	SF	3	C		107		DE
PALE	11	0035E	0036U	0036D	S27	E 6	.372	15056	11.5	1D	1N	3	C		375		DE F
HTPR	11	0930	0947	1010	S28	W03	.379		11.2	40	SB		C	0947	180		E
TEHR	11	0948	0951	1000	S27	E 5	.368		11.8	12	SN	2	C		154		U
MCMA	11	1515	1515	1522	N28	E43	.805	15061	14.9	7	SN		C	1515	50		D,H,V
MCMA	11	1526	1528	1532	S29	E74	.957	15062	17.2	6	SN		C	1528	30		D
MCMA	11	1718	1724	1738	S23	W12	.352	15056	10.8	20	SB		C	1724	75		E,H
MCMA	11	1742	1745	1750D	S23	W12	.352	15056	10.8	8D	SN		C	1745	40		D
PALE	11	2032	2034	2054D	S26	W 9	.372		11.2	22D	SF	3	C		60		DE
PALE	11	2154E	2223U	2242D	S27	W 5	.368	15056	11.5	48D	1B	3	C		482		U F
TEHR	12	0743	0746	0756	S27	W 7	.377		11.8	13	SF	2	C		127		
MONT	12	1058E	1100	1106	S28	W11	.414		11.6	8D	SF		C	1100	40		E
HERS	12	1122	1137	1216	S27	W13	.415	15056	11.5	54	1B		S				
MONT	12	1125	1132	1238	S27	W12	.407	15056	11.6	73	1N		C	1132	350		
RAMY	12	1155E	1157	1210D	S26	W13	.401		11.5	15D	SN	3	C		150		
PALE	12	1816	1816	1831	S27	W15	.431		11.6	15	SF	3	C		28		DE
PALE	12	1833	1834	1838	S27	W15	.431		11.6	5	SF	3	C		24		DE
PALE	12	1846	1850	1903	S27	W15	.431		11.7	17	SN	3	C		196		U F
RAMY	12	1849E	1850	1856	S28	W17	.460		11.5	7D	SN	3	C		111		DE
PALE	12	2127	2132	2152	S26	W20	.466		11.4	25	SF	3	C		88		FDE
PALE	12	2254	2255	2347	S26	W21	.476		11.4	53	SF	3	C		50		U F
PALE	13	0033	0039	0048D	S26	W24	.508	15056	11.2	15D	1N	3	C		325		U F
PALE	13	0137	0139	0201	S26	W25	.519	15056	11.2	24	1N	3	C		203		FDE
PALE	13	0137	0139	0140D	S26	W24	.508	15056	11.3	3D	1N	3	V		200		FDE
PALE	13	1741	1743	1752	S26	W33	.608		11.3	11	SN	3	C		63		FDE
RAMY	13	1742E	1743	1753	S26	W33	.608		11.3	11D	SN	3	C		127		F
RAMY	13	1915E	1922	1929	S27	W29	.571		11.6	14D	SN	3	C		95		F H
RAMY	13	2045E	2048	2052	S23	E17	.403		15.1	7D	SF	2	C		48		F
HTPR	14	1014	1018	1023	S23	E09	.331		15.1	9	SF		C	1018	40		E
HTPR	14	1445	1447	1449	S27	W41	.700		11.5	4	SF		C	1447	30		
HTPR	14	1446	1451	1513	S26	W45	.737		11.2	27	SF		C	1451	20		
HTPR	14	1446	1456	1513	S26	W45	.737		11.2	27	SF		C				

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DECEMBER 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION — MIN.	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE DEC	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	NOAA PLAGE REGION	CMP DAY			CORD.	TYPE	TIME — UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
RAMY	14	1848E	1850	1858	S25	W47	.754		11.3	100	SN	3	C		48		F R
HTPR	15	1015	1021	1046	N17	E45	.765		18.8	31	SF		C	1021	40		E
┌HTPR	15	1134	1141	1146	S26	W52	.805		11.6	12	SF		C	1141	50		
└MONT	15	1136	1139	1144	S26	W51	.796		11.7	8	SF		C	1139	20		D
HTPR	15	1254	1302	1308	S26	W53	.814		11.6	14	SF		C	1302	30		E
HTPR	16	0815	0819	0835	N15	E30	.590		18.6	20	SF		C	0819	20		E
HTPR	16	1303	1307	1315	S25	E06	.347		17.0	12	SF		C	1307	30		E
MCMA	16	1901		1906D	N25	W22	.606	15061	15.1	50	SN		P	1901	25		E
HTPR	17	1534	1539	1541	N19	E02	.415		17.8	7	SF		C	1539	20		
HTPR	18	0809	0814	0823	N23	E78	.988		24.2	14	SF		C	0814	20		
HTPR	18	1344	1349	1355	N16	W14	.430		17.5	11	SF		C	1349	10		
PALE	19	0228	0229	0233	N16	W15	.438		18.0	5	SF	3	C		22		DE
HTPR	19	1522	1524	1531	N17	W26	.559		17.7	9	SF		C	1524	40		E
HTPR	20	1106	1109	1111	S27	E17	.456		21.7	5	SF		C	1109	10		
MCMA	23	1457	1458	1508	N23	E08	.485	15070	24.2	11	SN		C	1458	50		E,H
MCMA	23	1814E	1818	1855D	N13	E78	.983	15075	29.6	41D	SN		C	1818	15		D
MCMA	23	1956E		1959D	N21	E77	.984	15075	29.6	3D	SF		P	1956	20		D
┌PALE	24	1845	1852	1908	N22	W12	.490		23.9	23	SF	3	C		54		FDE
└RAMY	24	1848E	1851	1914	N21	W13	.482		23.8	26D	SN	3	C		127		DE
┌PALE	24	2018E	2018U	2022D	S27	W42	.716		21.7	4D	SN	3	C		63		F
└RAMY	24	2020E	2022	2030	S27	W44	.736		21.5	10D	SN	3	C		64		DE
┌HTPR	25	1356	1358	1400	S29	W56	.849		21.4	4	SF		C	1358	20		
└MCMA	25	1356E	1357	1401	S27	W53	.820	15074	21.6	5D	SF		C	1357	25		D,H
PALE	25	1829E	1830U	1830D	S27	W56	.845		21.6	1D	SF	3	C		90		F
PALE	25	1912	1918	1933	S27	W56	.845	15074	21.6	21	1N	3	C		184		F H
PALE	25	2102	2105	2111	S27	W57	.853		21.6	9	SF	3	C		20		F
PALE	25	2143	2144	2153	S26	W55	.835	15074	21.8	10	1N	3	C		170		FDE
PALE	25	2304	2306	2308	S26	W56	.843		21.8	4	SF	3	C		21		FDE
PALE	25	2312	2313	2323	S26	W56	.843		21.8	11	SF	3	C		53		DE F
PALE	25	2348	2349	2352	S26	W56	.843		21.8	4	SF	3	C		26		DE F
PALE	26	0054	0054	0058	S26	W57	.852		21.8	4	SF	3	C		24		DE
PALE	26	0127	0127	0133	S27	W57	.854		21.8	6	SF	3	C		55		DE F
PALE	26	0136	0136	0136	S26	W57	.852		21.8	2	SF	3	C		18		DE
PALE	26	0140	0142	0145	S26	W57	.852		21.8	5	SF	3	C		22		DE
PALE	26	0150	0155	0157	S26	W57	.852		21.8	7	SF	3	C		27		DE F
PALE	26	0251	0257	0300	S26	W58	.860		21.8	9	SF	3	C		103		DE F
HTPR	26	0821	0822	0845	N18	W38	.692		23.5	24	SF		C	0822	40		E
HTPR	26	0905	0908	0916	N18	W38	.692		23.5	11	SF		C	0908	20		
HTPR	26	0946	0948	0957	S29	W68	.931		21.3	11	SF		C	0948	40		E
HTPR	26	1000	1003	1006	S29	W68	.931		21.3	8	SF		C	1003	10		
HTPR	26	1101	1102	1103	S29	W69	.936		21.3	2	SF		C	1102	10		
┌HTPR	26	1115	1159	1223	S29	W69	.936		21.3	68	SN		C	1159	40		K
└RAMY	26	1205E	1207U	1221D	S26	W60	.875		22.0	16D	SB	1	C		190		DE H
HTPR	26	1159	1208	1225	N24	E56	.879		30.7	26	SF		C	1208	20		E
┌HTPR	26	1208	1221	1225	S14	E90	1.000		3.3	17	SF		C	1209	20		
└RAMY	26	1221E	1221U	1230D	S20	E90	1.000	15081	3.3	9D	1B	2	C		0		
HTPR	26	1250	1253	1257	S29	W69	.936		21.4	7	SN		C	1253	40		
┌HTPR	26	1332	1336	1342	S29	W69	.936		21.4	10	SN		C	1336	70		
└RAMY	26	1340E	1341U	1346	S25	W70	.939		21.3	6D	SN	3	C		40		.FDE
┌MCMA	26	1430	1437	1444	S25	W72	.950	15074	21.2	14	SB		C	1437	25		E,H,S
└HTPR	26	1432	1437	1443	S29	W70	.941		21.4	11	SN		C	1437	20		
MCMA	26	1516	1530	1540D	S25	W72	.950	15074	21.2	24D	SN		C	1530	30		E,K
┌MCMA	26	1555E	1648	1730D	S25	W73	.954	15074	21.2	95D	SN		C				
└MCMA	26	1555E	1611	1730D	S25	W73	.954	15074	21.2	95D	SN		C	1648	40		D,K
MONT	27	0845	0848	0858	S18	E79	.979		3.3	13	SF		C	0848	40		E
RAMY	27	1313E	1313U	1320	S17	E71	.943		2.9	7D	SF	3	C		64		DE
MCMA	27	1435	1442	1502	S16	E72	.948	15081	3.0	27	1N		C	1442	80		E
RAMY	27	1449E	1449U	1454	N15	E71	.956		2.9	5D	SF	3	C		32		DE
MCMA	27	1513E	1513	1522	S18	E71	.943	15081	3.0	9D	SN		C	1513	50		E
MCMA	27	1548E	1548	1554	S16	E74	.958	15081	3.2	6D	SF		C	1548	30		D
MCMA	27	1714E		1753D	S28	W88	.998	15074	21.1	39D	SF		C	1740			D

Hα SOLAR FLARES

DECEMBER 1977

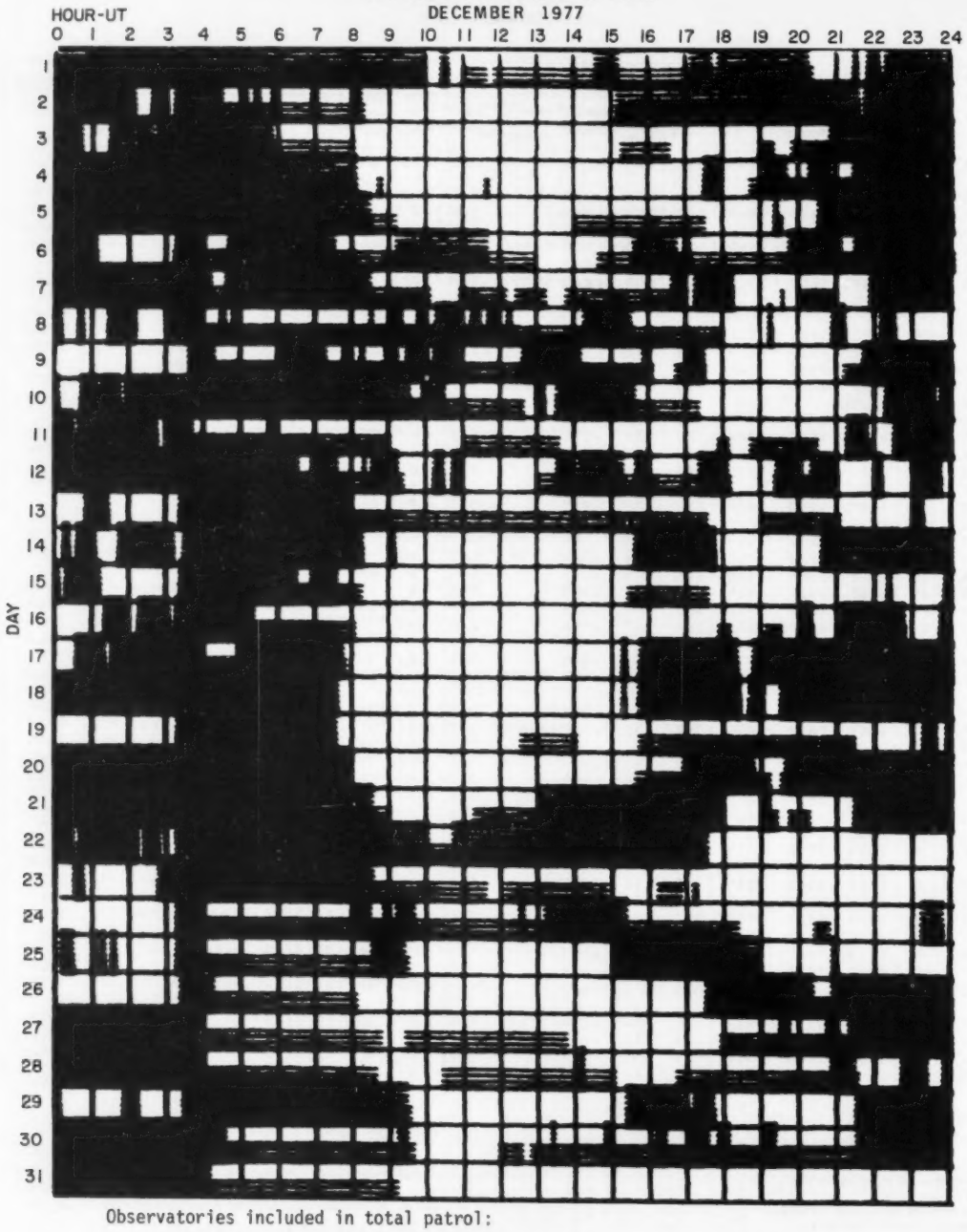
OBSERVATORY	OBSERVED UT				LOCATION					DURATION — MIN.	IMPORTANCE	OBS.		MEASUREMENTS'			REMARKS
	DATE DEC	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP. DAY			CORD.	TYPE	TIME — UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
MCMA	27	1846E		1849D	S17	E72	.948	15081	3.2	3D	1N		P	1846	80		E
HTPR	28	0829E		0855	S15	E63	.889	15081	3.1	26D	1N		C	0838	110		E
HTPR	28	0856	0913	0943	S17	E68	.925		3.5	47	SN		C	0913	90		E
TEHR	28	0858	0902	0928	S19	E70	.938		3.6	30	SF	3	C		64		DE R
MCMA	28	1518	1520	1523	N23	E30	.645	15080	30.9	5	SN		C	1520	50		D,V
MCMA	28	1552	1602	1625	N21	W68	.947	15070	23.6	33	1N		C	1602	60		E,L
MCMA	28	1607E	1610	1617	S18	E90	1.000	15083	5.4	10D	SN		C	1610			D
MCMA	28	1614	1623	1635	S18	E59	.859	15081	3.1	21	SN		C	1623	80		E
PALE	29	0012	0015	0023	N19	W68	.945		23.9	11	SN	3	V		73		FDE
PALE	29	0012	0015	0023	N19	W68	.945		23.9	11	SN	3	C		73		FDE
PALE	29	0012	0035	0105	S18	E81	.985	15081	5.1	53	1N	3	V		124		DE
PALE	29	0012	0035	0105	S18	E81	.985	15081	5.1	53	1N	3	C		124		DE
HTPR	29	0928E		0945	S15	E78	.975		5.2	17D	SF		C	0930	10		
HTPR	29	0947	0950	0955	S16	E57	.840		3.7	8	SF		C	0950	30		E
HTPR	29	1008	1015	1028	S15	E78	.975		5.3	20	SF		C	1015	40		
HTPR	29	1028	1030	1051	S15	E56	.830		3.6	23	SF		C	1030	30		E
HTPR	29	1054	1055	1102	S15	E56	.830		3.7	8	SN		C	1055	40		E
HTPR	29	1059	1105	1107	S15	E78	.975		5.3	8	SF		C	1105	10		
HTPR	29	1109	1113	1116	S15	E78	.975		5.3	7	SF		C	1113	20		
HTPR	29	1138	1141	1147	S15	E55	.820		3.6	9	SF		C	1141	110		E
RAMY	29	1143E	1145	1149	S18	E49	.764		3.2	6D	SN	3	C		80		DE
RAMY	29	1305E	1313	1321	S17	E79	.979		5.5	16D	SF	2	C		0		DE
HTPR	29	1311	1312	1316	S15	E75	.963		5.2	5	SN		C	1312	20		
HTPR	29	1406	1411	1414	S15	E75	.963		5.2	8	SF		C	1411	20		
HTPR	29	1424	1427	1432	S14	E55	.819		3.7	8	SB		C	1427	60		E
RAMY	29	1652E	1652U	1707	S20	E52	.798		3.6	15D	SN	2	C		95		F
PALE	29	1924	1926	1934	N20	E11	.449		30.6	10	SN	3	C		83		DE
PALE	29	1941	1942	1951	S18	E71	.943		5.1	10	SN	3	C		81		DE
PALE	29	2055	2057	2111	N20	E10	.443	15075	30.6	16	1B	3	C		218		DE F
HTPR	30	0934	0934	0936	S14	E32	.545		2.8	2	SF		C	0934	10		
HTPR	30	1004	1007	1014	S13	E31	.527		2.7	10	SF		C	1007	70		E
HTPR	30	1020	1023	1036	S13	E31	.527		2.8	16	SB		C	1023	180		E
RAMY	30	1255E	1257	1310	S17	E34	.583		3.1	15D	SB	4	C		90		DE
RAMY	30	1550E	1553	1601	S19	E38	.641		3.5	11D	SN	3	C		64		R
PALE	30	1805	1807	1815	S17	E57	.841		5.0	10	SF	3	V		21		DE
PALE	30	1805	1807	1815	S17	E57	.841		5.0	10	SF	3	C		21		DE
PALE	30	1838	1838	1856	S18	E33	.575		3.3	18	SF	3	C		43		DE
PALE	30	1903	1906	1914	S17	E57	.841		5.1	11	SF	3	V		71		DE
PALE	30	1908	1909	1957	N20	W 3	.414		30.6	49	SF	3	C		26		FDE
PALE	30	1948	1951	2009	S17	E56	.832		5.0	21	SF	3	V		21		DE
PALE	30	1948	1951	2009	S17	E56	.832		5.0	21	SF	3	C		21		DE
PALE	30	2010	2012	2040	S22	E37	.642		3.6	30	SN	3	C		41		DE F
PALE	30	2010	2012	2040	S22	E37	.642		3.6	30	SN	3	V		44		DE F
RAMY	30	2013E	2015	2036	S22	E37	.642		3.6	23D	SN	3	C		48		
PALE	30	2030	2032	2045D	N20	W 3	.414		30.6	15D	SF	3	V		24		DE
PALE	30	2030	2032	2045D	N20	W 3	.414		30.6	15D	SF	3	C		24		DE
HTPR	31	0907	0908	0914	S16	E44	.704		4.7	7	SN		C	0908	120		
HTPR	31	1205	1205	1211	S14	E18	.347		2.9	6	SF		C	1205	20		
HTPR	31	1309	1313	1316	S15	E42	.678		4.7	7	SF		C	1313	10		
HTPR	31	1346	1347	1349	S14	E17	.333		2.8	3	SN		C	1347	20		

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE



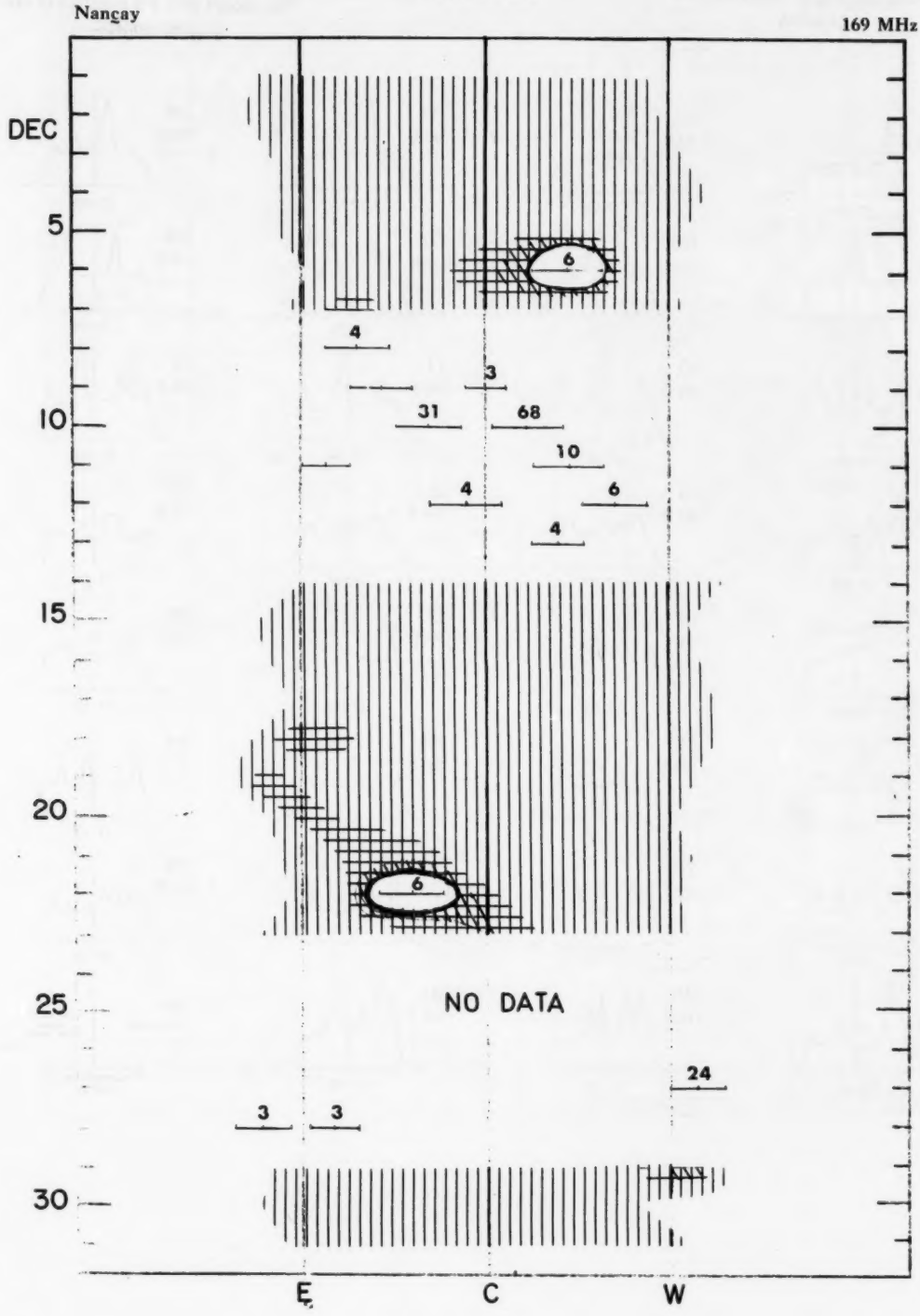
Observatories included in total patrol:

Bucharest	Herstmonceux	McMath-Hulbert	Ramey	Upice
Catania	Kandilli	Monte Mario	Tehran	Wendelstein
Haute Provence	Locarno	Palehua		

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

DECEMBER 1977



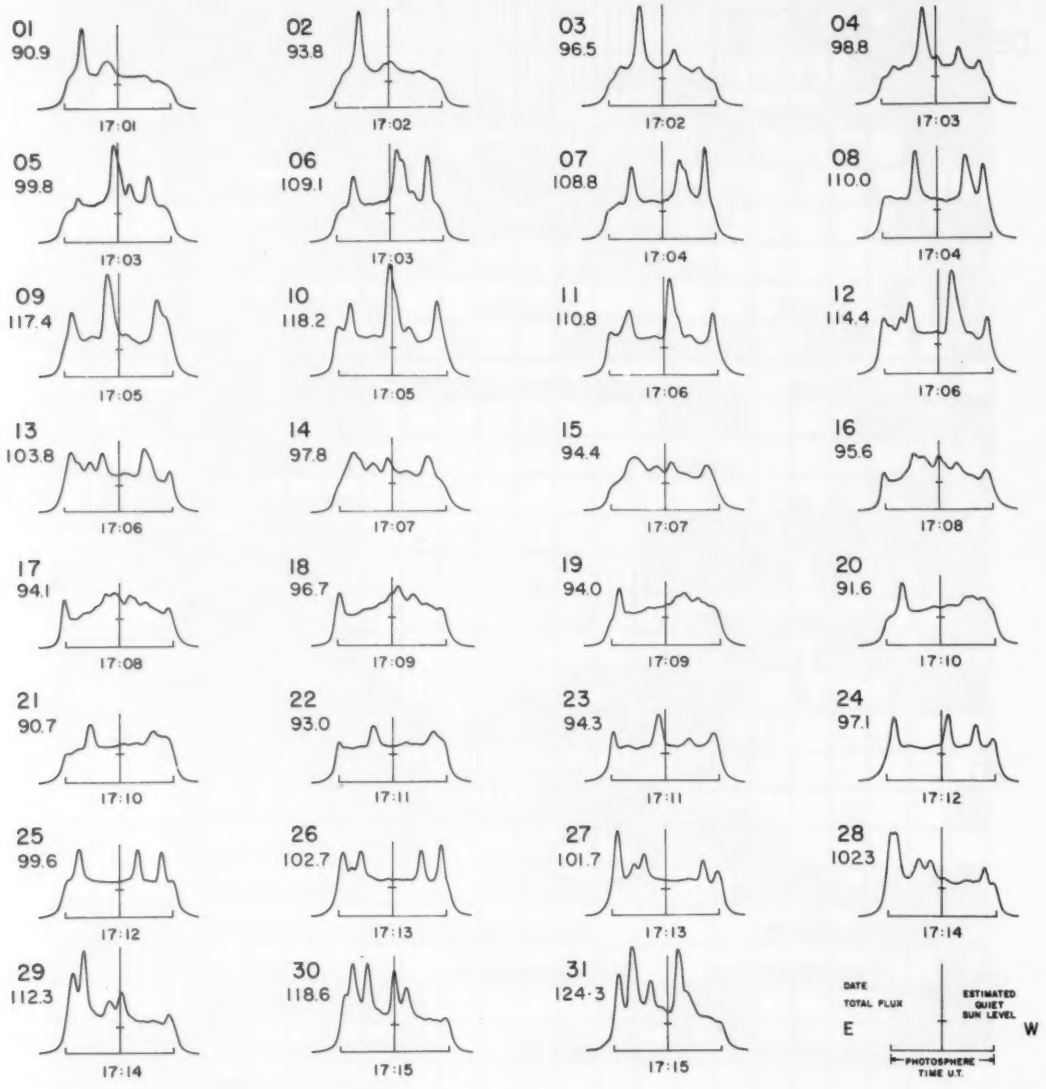
16
Dec 77

EAST-WEST SOLAR SCANS

ALGONQUIN RADIO OBSERVATORY
CANADA

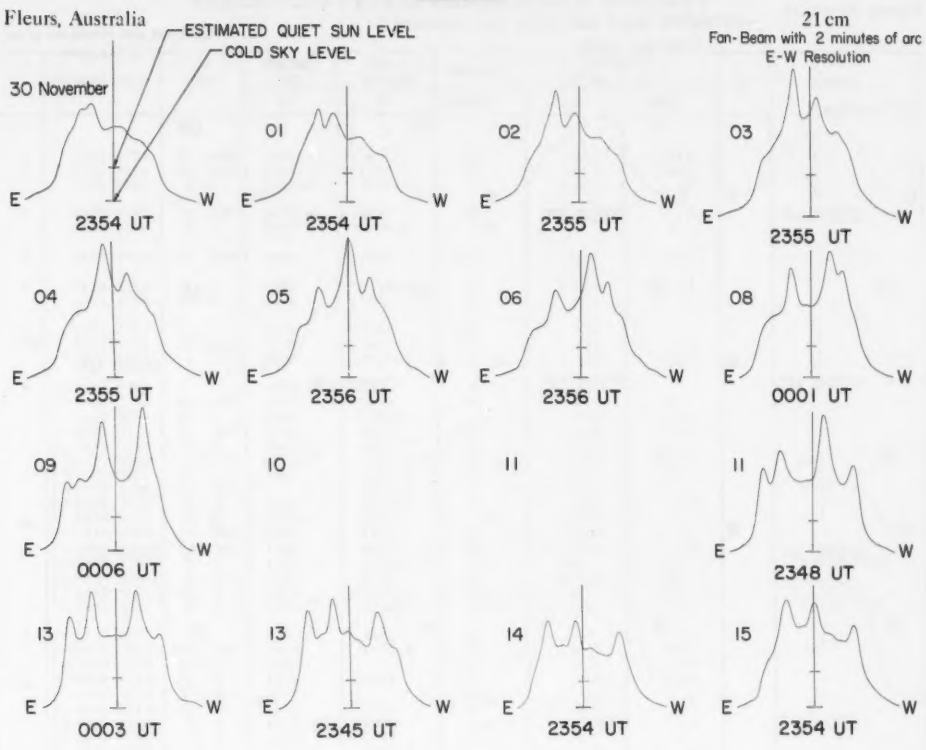
DECEMBER 1977

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution



EAST-WEST SOLAR SCANS

DECEMBER 1977



No Data 17-31 December

EAST-WEST SOLAR SCANS

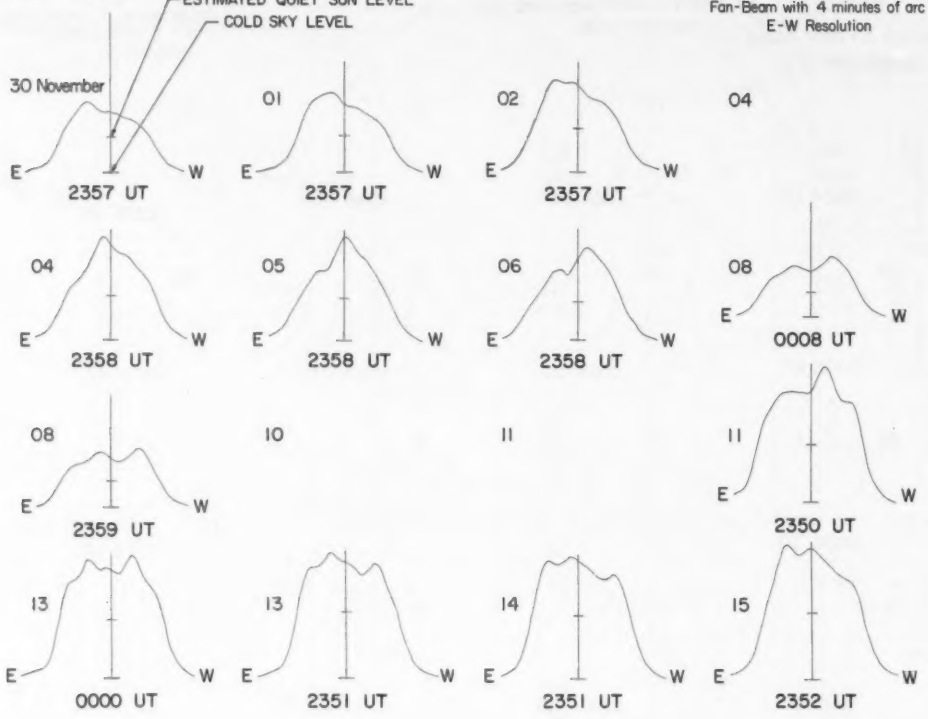
DECEMBER 1977

Fleurs, Australia

ESTIMATED QUIET SUN LEVEL

COLD SKY LEVEL

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution



No Data 17-31 December

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

DECEMBER 1977

	FREQUENCY	STATION	TYPE	STARTING TIME	TIME OF MAXIMUM	DURATION	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1}		INT	REMARKS
				UT	UT	MINUTES	PEAK	MEAN		
1	2800	OTTA	32 ABS	1605	1617	25	-2.2	-1.1		
	2800	OTTA	32 ABS	1800	1817	25	-2.4	-1.2		
	2695	PENT	1 S	2013.2	2013.7	1	1.4	.7		
2	2695	PENT	20 GRF	1800	1812	40	1.2	.6		
	2695	BOUL	3 S	1918	1919.5	3.5	4	1		
3	2800	OTTA	20 GRF	1645	1810	200	2.4	1.2		
4	2800	OTTA	1 S	1355	1355.5	1	1.2	.8		
	2800	OTTA	240 R	1500	1555	55	1.8	.9		
5	2800	OTTA		1454	1458	185	5.2			
	2800	OTTA	20 GRF	1800	1811	75	1.8	1		
	2800	OTTA	2 S/F	2031	2031.5	6	1.6	.8		
6	2800	OTTA		1420 E		5 D	2			
	2800	OTTA	31 ABS	1425	1445	57	-2	-1		
	2800	OTTA	45 C	1530	1533.9	6.5	3.2	1.6		
	2800	OTTA	21 GRF	1546	1649	170	5.6	2.6		
	2800	OTTA	40 F	1546.2	1547.7	25	22.4			
	2695	SGMR	4 S/F	1546.4	1547.6	21.7	27.7	8.3		CONT
	2695	BOUL	45 C	1547	1548.5	21	22	7		
	2695	SGMR	4 S/F		1601.7		26.7			CONT
	2800	OTTA	1 S	1615	1616.6	9	1.8	.9		
	2800	OTTA	8 S	1652.9	1653	.4	2.8			
	2800	OTTA	20 GRF	1735	1740	48	1.4	.7		
	2800	OTTA	23 GRF	1900	2010	90	2.8	1.6		
	8800	SGMR	3 S	1933	1934.5	7	385	154		4,CONT,SWF
	2800	OTTA	4 S/F	1933	1935	11	116	20		
	2695	BOUL	45 C	1933	1935.5	11.5	95	30		
	2695	SGMR	3 S	1933.7	1934.6	8.3	116	46.4		4,CONT,SWF
7	2800	OTTA		1400	1403	55	6			
	4800	SGMR	20 GRF	1440	1450.4	98.2	31.5	15.8		SWF
	2800	OTTA	27A RF	1530		390	2.6	2.6		
	2800	OTTA	24 R	1530	1536	6	2.8	1.4		
	2800	OTTA	24P R	1536		334	2.8			
	2800	OTTA	21 GRF	1540	1555	55	2.6	1.4		
	2800	OTTA	1 S	1557.9	1559	3.5	3.2	1.6		
	2695	BOUL	3 S	1559	1600	3	4	1		
	2800	OTTA	1 S	1640	1640.3	2	1.6	.8		
	2695	BOUL	3 S	1650.5	1653.5	7	5	2		
	2800	OTTA	2 S/F	1651.9	1653	2	2.4	1		
	8800	SGMR	4 S/F	1919	1922.1	4	185	75.2		
	2800	OTTA	4 S/F	1945.5	1946.5	2.5	22	5.5		
	2695	BOUL	8 S	1947	1947.5	2	20	7		
	2800	OTTA	2 S/F	1949	1952.5	5	4.8	2.4		
	2695	BOUL	45 C	1951.5	1953	3	5	2		
	2800	OTTA	21 GRF	1955	2035	70	3.2	1.6		
	2800	OTTA	8 S	2047.7	2048	.5	3	1.5		
	2695	PENT	26 FAL	2110	2200	50	-2.8	-1.4		
8	2800	OTTA	20 GRF	1550	1640	120	3	1.6		
9	8800	MANI	1 S	0656.8	0657	.6	8.6	3.9		
	2695	MANI	3 S	0656.8	0657	.6	10.2	3.6		
	2695	MANI	3 S	0806	0806.4	1.1	10.2	4.3		
	2500	OTTA	26 PRE	1356	1357.6	2.5	4	2		
	2800	OTTA	3 S	1358.5	1359.2	6	66	10.5		
	2800	OTTA	20 GRF	1515	1555	75	1.6	.8		
	2800	OTTA	20 GRF	1635	1700	70	1.8	.9		
	2800	OTTA	20 GRF	1853	1900	30	1.8	1		
	2695	PENT	21 GRF	2000	2035	90	3	1.6		
	2695	PENT	1 S	2024	2027.5	9	1.6	.8		
	2695	BOUL	45 C	2215.5	2217	3.5	19	6		
10	8800	MANI	45 C	0307.9	0311.8	38.6	330	114.8		
	8800	MANI	45 C		0320.8		123.4			
	2695	MANI	45 C	0307.9	0311	36.5	131.7	44.5		
	2695	MANI	45 C		0320.7		111			
	2695	MANI	1 S	0506.9	0507.8	1.5	8.9	2		
	8800	MANI	4 S/F	0755	0756.8	10	28	11.5		
	2695	MANI	4 S/F	0752.8	0756.8	12.2	29.7	13.9		
	2800	OTTA	20 GRF	1453	1510	45	1.6	.8		
	2800	OTTA	21 GRF	1615	1635	95	2.8	1.4		
	2800	OTTA	1 S	1624.2	1626.8	6	3.4	1.2		
	2695	BOUL	3 S	1646	1648	4.5	6	2		
	2800	OTTA	1 S	1816	1817	2	1.4	.7		
	2695	BOUL	1 S	1816.5	1817	1.5	3	1		
	2695	BOUL	3 S	2234	2237	5.5	7	2		
11	8800	MANI	1 S	0032	0035.4	8	5.7	2.1		
	2695	MANI	3 S	0033.7	0036	10.3	2	.6		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

DECEMBER 1977

	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	2800	OTTA	27A RF	1717		225	1.4	1.3		
	2800	OTTA	24 R	1717	1720	3	1.4	.7		
	2800	OTTA	24P R	1720		200	1.4			
	2800	OTTA	20 GRF	1905	1909	30	4	1.6		
	2695	PENT	26 FAL	2040	2102	22	-1.4	-.7		
	2695	PENT	4 S/F	2158	2200	9	28	7		
	2695	BOUL	45 C	2159	2201	8	25	7		
	2695	BOUL	3 S	2226	2227	2.5	5	2		
	2695	PENT	1 S	2226.5	2227	1.5	3.8	1.9		
12	2695	MANI	1 S	0221.6	0223.2	6.9	6.1	3.1		I
	2695	SGMR	1 S	1421.2	1424.6	3.8	9.5	2.9		
	2800	OTTA	21 GRF	1422	1455	60	3.5	1.7		
	8800	SGMR	20 GRF	1422.9	1433.9	22.3	25.2	7.6		
	2800	OTTA	1 S	1423	1424.1	2	4.4	2.2		
	2800	OTTA	20 GRF	1543	1543.5	30	2.2	1.1		
	2800	OTTA	23 GRF	1655	1730	100	4.2	2.1		
	2800	OTTA	1 S	1722	1728.3	3	6.5	2.2		
	2695	BOUL	8 S	1724	1724.5	2.5	7	2		
13	2800	OTTA	22 GRF	1740	1805	45	1.2	.8		
14	2800	OTTA	20 GRF	1443	1510	190	2.2	1.1		
18	2800	OTTA	1 S	1606	1610	10	.8	.5		
24	2695	SGMR	4 S/F	1303.2	1304.3	3.3	22.5	6.8		S
	2695	SGMR	4 S/F	1419	1419.7	1.6	21	4.2		
	2800	OTTA	28 PRE	1606.1		1.6	1.2			
	2695	SGMR	4 S/F	1606.4	1609.1	4.2	22.3	6.7		
	8800	SGMR	4 S/F	1607.3	1608.7	3	17.1	5.1		
	2800	OTTA	3 S	1607.7	1608.9	2.5	18	7		
	2800	OTTA	1 S	1814	1814.5	1.2	.8	.4		
	2800	OTTA	22 GRF	1842	1851	30	2			
	2695	SGMR	4 S/F	2016	2017.8	5	7.9	2.4		
25	2800	OTTA	1 S	1826	1828	7	1	.5		
	2695	BOUL	3 S	2038.5	2039.5	1.5	3	1		
	2695	BOUL	3 S	2141.5	2142	2.5	6	2		
26	2695	MANI	1 S	0159	0204	11.8	6.7	2.7		
	8800	MANI	3 S	0159.9U	0203.3	10.3U	18.8	6.2		
	2800	OTTA	20 GRF	1525	1550	60	1	.5		
	2800	OTTA	240 R	1635	1650	15	1	.5		
	2800	OTTA	23 GRF	1825		130 D	4.8			
	2695	SGMR	46 C	1833.6	1859.9	38.6	58.2	17.5		SWF
	8800	SGMR	4 S/F	1850.2	1900	46.6	50	15		SWF
	2800	OTTA	4 S/F	1855.8	1859.9	17	46	10.2		
	2695	BOUL	45 C	1858	1900.5	18.5	43	14		
	2695	SGMR	46 C		1905.9		29			SWF
	2695	BOUL	45 C	2037.5	2039	2.5	4	1		
	2695	MANI	1 S	2326.4	2327.3	1.6	4.1	1.4		
	8800	MANI	1 S	2326.5	2327	2	5.6	2.2		I
27	8800	MANI	3 S	0307 U	0313.1	10 U	20.2	6.7		
	2695	MANI	3 S	0312.7	0312.9	4.3	62.1	20.7		
	2695	MANI	3 S	0441.5	0442.3	2.5	12.4	4.1		
	8800	MANI	47 GB	0856.7	0856.9	.6	2500	800		
	2800	OTTA	22 GRF	1425	1440	30	1.8	.9		
	2800	OTTA	1 S	1510	1517	10	1	.5		
	2800	OTTA	22 GRF	1530	1540	30	1	.7		
	2800	OTTA	20 GRF	1610	1620	40	1.6	1		
	2800	OTTA	22 GRF	1840	1644	23	1.8	.9		
	2800	OTTA	22 GRF	1915	1942	40	2.2	1.1		
28	2800	OTTA	20 GRF	1425	1615	125	2.6	1.3		
	2800	OTTA	20 GRF	1718	1725	15	1	.5		
	2800	OTTA	2 S/F	1735.9	1738	2.6	2.8	1.6		
	2800	OTTA	29 PBI	1738.5	1738.5	15	1	.5		
	2800	OTTA	20 GRF	1825	1915	85	1.4	.7		
	2695	BOUL	1 S	2145	2146	1.5	3	1		
29	2800	OTTA	21 GRF	1423	1430	20	2	1.2		
	2800	OTTA	40 F	1424.9	1426	2	13.8			
	2800	OTTA	240 R	1530	1540	10	1.4	.7		
	2800	OTTA	22 GRF	1550	1640	125	4.6	2.3		
	2695	BOUL	3 S	2239	2240.5	1.5	5	2		
30	2695	MANI	4 S/F	0408	0409.7	10.5	305.4	116.2		
	8800	MANI	4 S/F	0409	0410.3	3.5	293.5	128.7		
	2800	OTTA	4 S/F	1323	1325.5	11	15.8	7		
	2695	SGMR	1 S	1323.6	1325.8	7.4	8.7	4		
	2695	BOUL	23 GRF	2008	2010.5	31	6	2		
	2695	BOUL	8 S	2250	2251.5	3	8	3		
31	2800	OTTA	27 RF	1500		200	2.4	2.1		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

DECEMBER 1977

	FREQUENCY	STATION	TYPE	STARTING TIME	TIME OF MAXIMUM	DURATION	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1}		INT	REMARKS
				UT	UT	MINUTES	PEAK	MEAN		
	2800	OTTA	24 R	1500	1535	35	2.4	1.2		
	2800	OTTA	24P R	1535		155	2.4			
	2800	OTTA	26 FAL	1810	1820	10	-2.4	-1.2		
	2800	OTTA	20 GRF	1835	1940	90 D	5.4			
	2695	MANI	3 S	2331.4	2331.9	.7	14.5	6		1

Observatories:

BOUL = Boulder MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

SOLAR X-RAYS BY SATELLITE
SMS GOES
DECEMBER 1977

.5 - 4Å Hourly Averages (10^{-5} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
12/ 1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	B	B	.001	B	B	B	B
12/ 2	B	B	B	B	B	B	B	B	B	B	B	B	P	B	B	B	B	B	B	B	B	B	B	B	B
12/ 3	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/ 4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/ 5	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.004	B	B	B	B	B	.002	.003	B	
12/ 6	.001	.001	.001	B	B	B	B	B	.001	B	B	.001	.002	B	B	.003	.003	.002	B	.036	B	B	B	.002	.003
12/ 7	.002	B	.006	.003	.002	.003	.017	.003	.002	.004	.010	.009	.006	.001	.003	.026	.004	.013	.006	.011	.011	.003	.001	.002	.006
12/ 8	.002	.004	.002	.001	.001	.001	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/ 9	B	B	B	B	B	B	.004	.006	.002	.002	.003	B	.001	.002	.002	.001	B	.002	.002	.002	.003	.002	.003	.009	.002
12/10	.002	.006	B	.240	.004	.004	.003	.020	.018	.001	.003	.001	B	.002	.002	.002	.003	.005	.002	B	B	B	B	B	.013
12/11	.026	.005	B	B	B	B	B	B	.001	.007	B	B	B	B	B	B	B	B	B	.003	.002	.004	.192	.004	.010
12/12	B	B	.030	.010	B	B	B	.002	.001	B	B	.012	.005	B	.005	.002	B	.003	.001	B	B	B	B	B	.003
12/13	.004	.002	B	B	B	B	B	.001	B	B	B	B	B	B	B	B	B	B	P	B	B	B	B	B	B
12/14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/15	B	B	B	B	B	B	B	B	B	B	.024	B	B	B	B	B	B	B	B	B	B	B	B	B	.001
12/16	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
12/17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/22	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	M	B
12/23	.004	.001	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/24	B	B	B	B	B	B	B	M	M	M	M	M	B	.002	.001	B	.002	B	B	B	.003	B	B	B	B
12/25	B	B	B	B	B	B	B	B	B	B	B	.006	B	B	B	B	B	B	B	.001	B	.003	.002	.006	.001
12/26	B	.006	.244	.007	.001	.001	.002	B	B	B	B	B	.010	.003	.001	.001	.001	.003	.005	.023	.002	.003	.002	.102	.017
12/27	.005	.006	.008	.010	.009	.002	B	.019	.002	.002	.021	.033	.003	.002	.003	.002	B	B	.003	.004	B	B	B	B	.006
12/28	B	B	.002	B	B	.002	B	B	.003	.091	.027	.004	.003	.002	.001	B	.002	B	B	.001	.003	.013	.004	B	.007
12/29	.026	.005	B	B	B	.001	.004	.002	.003	.033	.004	.013	.016	B	.003	B	.005	.002	B	.001	B	B	B	B	.005
12/30	B	.001	B	B	.073	B	B	B	B	.001	.006	B	.005	.002	B	.007	P	B	B	B	.001	B	.132	B	.010
12/31	B	.003	B	.001	.002	B	B	B	B	.002	B	B	B	P	B	B	B	B	B	.004	B	B	B	.039	.002

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE
SMS GOES
DECEMBER 1977

1 - 8Å Hourly Averages (10^{-4} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	DAY
12/ 1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	.001	.001	.003	.002	.001	.002	.001
12/ 2	.001	.002	.002	.002	.001	.002	.002	.001	.002	.003	.002	.001	.001	.001	.003	.002	.001	.001	.001	B	B	B	B	B	B
12/ 3	B	B	B	B	B	.001	.002	.001	B	B	B	B	B	B	.001	.001	B	.002	.002	.002	.001	.001	.001	.001	B
12/ 4	.001	.001	.001	.001	.001	.001	.002	.001	B	B	.001	B	B	.002	.001	.002	.001	.001	.001	.001	.001	.001	.001	.001	B
12/ 5	.002	.001	.001	.001	.001	.001	.001	.001	.001	.003	.002	.001	.002	.002	.003	.009	.004	.002	.003	.002	.004	.003	.008	.009	.002
12/ 6	.006	.005	.005	.005	.004	.004	.003	.003	.004	.003	.005	.006	.009	.006	.004	.008	.010	.008	.006	.029	.005	.004	.004	.007	.005
12/ 7	.009	.004	.012	.012	.007	.009	.028	.010	.008	.010	.021	.016	.015	.005	.009	.033	.016	.021	.019	.021	.029	.010	.006	.008	.010
12/ 8	.007	.011	.008	.006	.006	.006	.003	.003	.003	.003	.003	.003	.003	.005	.004	.004	.004	.003	.003	.003	.003	.004	.003	.005	.003
12/ 9	.004	.004	.004	.005	.004	.005	.008	.015	.011	.009	.011	.006	.007	.008	.008	.008	.006	.008	.008	.009	.010	.009	.011	.020	.005
12/10	.010	.005	.005	.132	.017	.014	.011	.037	.035	.008	.010	.007	.007	.009	.009	.009	.012	.016	.010	.005	.005	.004	.006	.005	.015
12/11	.032	.016	.006	.005	.006	.005	.004	.005	.006	.012	.004	.002	.003	.004	.005	.003	.003	.005	.004	.009	.009	.008	.160	.018	.012
12/12	.005	.004	.051	.032	.003	.003	.003	.007	.007	.003	.004	.023	.015	.004	.013	.009	.005	.012	.007	.004	.004	.004	.003	.003	.006
12/13	.009	.007	.003	.002	.003	.003	.003	.006	.002	.002	.002	.002	.002	.003	.002	.003	.002	.003	.003	.003	.003	.002	.002	.002	.002
12/14	.002	.002	.002	.001	.002	.001	.001	.001	.002	.002	.002	.001	.001	.001	.002	.002	.002	.003	.002	.002	.002	.002	.001	.001	B
12/15	.001	B	.001	.001	.001	B	.002	.001	B	.001	.002	.001	.001	.002	.001	B	.001	.002	.002	.001	.001	.001	.002	.001	.001
12/16	B	B	B	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.003	.003	.003	.002	.002	.002	.002	.002	.001	.002	B
12/17	.002	.002	.002	.002	.002	.002	.002	.002	.001	.001	.002	.002	.002	.001	.003	.002	.002	.002	.002	.002	.002	.002	.001	.002	.001
12/18	.002	.001	.001	.001	.001	.001	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002	.001	.002	.002	.002	.002	.002	.002	B
12/19	.002	.002	.003	.002	.001	.001	.001	.001	.001	B	B	B	B	B	B	B	B	.001	B	B	B	B	B	B	B
12/20	B	B	B	B	.002	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.001	.004	.002	.001	.001	B
12/21	B	.001	B	.001	.001	.001	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12/22	M	.001	B	B	.001	B	B	B	.002	B	.001	B	B	B	B	B	B	B	B	B	B	B	M	M	B
12/23	.014	.007	.003	.002	.002	.002	.002	.001	.001	.002	.001	B	B	B	B	.001	.001	.001	.001	B	.001	B	B	.002	B
12/24	B	B	B	.001	B	B	B	M	M	M	M	M	B	B	.001	.002	.001	.001	.001	.001	.001	.001	.001	.001	.001
12/25	.003	.002	.002	.002	.003	.003	.003	.003	.003	.003	.003	.012	.003	.004	.003	.001	.004	.002	.003	.002	.005	.002	.001	.001	.001
12/26	.004	.006	.185	.021	.007	.006	.008	.005	.004	.005	.005	.004	.005	.003	.002	.002	.002	.002	.004	.005	.004	.007	.005	.015	.003
12/27	.017	.015	.020	.025	.023	.010	.006	.025	.008	.008	.024	.052	.018	.010	.005	.006	.006	.009	.011	.042	.011	.011	.010	.079	.018
12/28	.004	.003	.006	.003	.003	.007	.004	.003	.010	.085	.051	.016	.014	.008	.011	.009	.005	.004	.008	.013	.003	.004	.003	.004	.010
12/29	.027	.016	.004	.003	.004	.005	.010	.008	.007	.045	.013	.018	.013	.011	.009	.007	.009	.007	.006	.006	.009	.016	.013	.005	.010
12/30	.004	.006	.004	.004	.033	.005	.005	.004	.005	.007	.012	.006	.011	.006	.008	.005	.012	.009	.006	.006	.005	.004	.008	.005	.008
12/31	.004	.005	.005	.007	.010	.006	.005	.004	.004	.006	.004	.003	.008	.008	.004	.004	.003	.004	.004	.004	.007	.004	.007	.005	.008
													.004	.004	.005	.005	.005	.005	.004	.010	.005	.005	.006	.041	.005

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE

GOES

DECEMBER 1977

DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
1	0622	6.4E-06	2.5E-04	0626	9.4E-05	1.0E-03	0630	1.2E-05	3.2E-04
1	0958	8.0E-07	1.2E-04	1004	1.8E-04	2.2E-03	1006	1.1E-05	4.0E-04
1	2012	3.8E-06	1.7E-04	2021	7.0E-05	1.0E-03	2024	2.8E-05	5.3E-04
1	2103	5.3E-06	2.1E-04	2108	1.2E-04	1.1E-03	2112	2.5E-05	5.7E-04
5	1452	0.0E+00	1.3E-04	1502	6.8E-05	1.3E-03	1510	1.5E-05	7.5E-04
5	2210	3.3E-06	2.5E-04	2217	6.0E-05	1.1E-03	2230	1.5E-05	6.8E-04
5	2307	5.0E-06	4.0E-04	2319	2.1E-04	3.4E-03	2323	6.4E-05	1.6E-03
6	0037	8.1E-06	5.2E-04	0044	4.4E-05	1.1E-03	0051	1.7E-05	7.9E-04
6	0842	2.6E-06	2.0E-04	0849	8.1E-05	1.8E-03	0856	3.1E-05	9.5E-04
6	1017	2.5E-06	2.5E-04	1029	2.1E-05	1.1E-03	1031	1.5E-05	6.6E-04
6	1204	6.4E-06	5.2E-04	1210	5.9E-05	1.7E-03	1214	3.1E-05	1.0E-03
6	1238	2.1E-05	7.7E-04	1243	4.9E-05	1.3E-03	1248	2.3E-05	1.0E-03
6	1545	4.6E-06	4.2E-04	1600	2.5E-04	3.7E-03	1605	6.0E-05	1.9E-03
6	1736	4.8E-07	4.9E-04	1745	1.1E-04	1.8E-03	1758	3.0E-05	1.1E-03
6	1931	5.7E-06	4.3E-04	1936	6.1E-03	3.3E-02	1938	1.7E-03	1.4E-02
6	2345	7.5E-06	4.5E-04	2357	1.1E-04	2.0E-03	0012	3.4E-05	1.2E-03
7	0239	1.3E-05	6.4E-04	0253	2.5E-04	3.9E-03	0305	5.9E-05	2.1E-03
7	0334	1.9E-05	9.0E-04	0337	5.5E-05	1.8E-03	0340	4.0E-05	1.3E-03
7	0452	1.0E-05	4.9E-04	0458	6.3E-05	1.1E-03	0502	2.3E-05	7.9E-04
7	0522	1.3E-05	5.9E-04	0528	1.9E-04	2.8E-03	0533	4.5E-05	1.6E-03
7	0607	5.4E-06	4.6E-04	0629	6.7E-04	7.4E-03	0642	1.4E-04	3.8E-03
7	0706	2.0E-05	8.9E-04	0711	1.2E-04	2.2E-03	0715	3.9E-05	1.5E-03
7	0826	2.5E-05	8.4E-04	0833	9.5E-05	2.0E-03	0838	4.3E-05	1.4E-03
7	0948	1.7E-05	7.0E-04	1001	2.9E-04	3.8E-03	1012	6.9E-05	2.2E-03
7	1033	2.8E-05	9.4E-04	1040	1.7E-04	2.4E-03	1106	4.1E-05	1.6E-03
7	1135	3.6E-05	7.8E-04	1143	3.7E-04	3.4E-03	1203	1.0E-04	2.0E-03
7	1207	6.5E-05	1.6E-03	1213	2.8E-04	4.1E-03	1217	1.1E-04	2.7E-03
7	1350	2.3E-05	6.5E-04	1353	5.4E-05	1.0E-03	1356	3.6E-05	8.3E-04
7	1359	2.2E-05	7.4E-04	1407	1.2E-04	1.9E-03	1413	4.2E-05	1.2E-03
7	1532	1.7E-05	6.5E-04	1551	1.0E-03	1.0E-02	1603	1.4E-04	5.1E-03
7	1637	1.1E-05	6.5E-04	1702	4.4E-05	1.2E-03	1726	1.6E-05	8.8E-04
7	1734	1.1E-05	6.7E-04	1754	9.2E-04	8.9E-03	1803	2.2E-04	4.6E-03
7	1858	1.8E-05	9.3E-04	1902	1.0E-04	2.1E-03	1911	3.4E-05	1.5E-03
7	1935	1.6E-05	7.6E-04	1947	1.0E-03	8.4E-03	1949	1.2E-04	3.2E-03
7	1950	1.7E-04	2.7E-03	1953	3.4E-04	5.0E-03	1958	1.9E-04	3.8E-03
7	2147	2.6E-05	9.7E-04	2150	6.6E-05	1.6E-03	2155	4.0E-05	1.2E-03
7	2250	1.1E-05	5.4E-04	2301	3.9E-05	1.1E-03	2309	1.8E-05	7.6E-04
7	2316	1.4E-05	6.3E-04	2331	3.8E-05	1.2E-03	2336	1.7E-05	8.7E-04
8	0127	3.3E-05	1.1E-03	0130	5.0E-05	1.8E-03	0134	4.5E-05	1.3E-03
8	0152	6.6E-05	1.5E-03	0155	1.2E-04	2.2E-03	0157	8.4E-05	1.8E-03
8	0536	8.0E-06	4.7E-04	0540	4.8E-05	1.0E-03	0543	1.2E-05	6.2E-04
8	1550	2.5E-06	3.2E-04	1555	5.6E-05	1.0E-03	1602	1.3E-05	6.9E-04
8	2039	3.3E-06	3.0E-04	2042	9.7E-05	1.6E-03	2044	2.6E-05	6.4E-04
9	0653	1.4E-05	6.7E-04	0659	6.8E-04	6.6E-03	0703	1.8E-04	3.3E-03
9	0805	2.2E-05	1.1E-03	0813	5.9E-05	1.8E-03	0819	3.6E-05	1.4E-03
9	0843	1.1E-05	7.3E-04	0847	3.7E-05	1.2E-03	0849	1.6E-05	9.6E-04
9	1009	1.1E-05	7.2E-04	1014	6.8E-05	1.9E-03	1016	4.9E-05	1.3E-03
9	1021	2.7E-05	1.0E-03	1024	1.2E-04	2.0E-03	1027	3.9E-05	1.2E-03
9	1044	1.9E-05	9.5E-04	1047	4.4E-05	1.8E-03	1051	3.6E-05	1.3E-03
9	1355	1.6E-05	7.8E-04	1400	2.1E-04	2.9E-03	1403	5.0E-05	1.6E-03

SOLAR X-RAYS BY SATELLITE

GOES

DECEMBER 1977

DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
9	1744	1.3E-05	7.6E-04	1750	5.0E-05	1.3E-03	1800	2.1E-05	1.0E-03
9	2024	2.4E-05	9.5E-04	2027	6.9E-05	1.9E-03	2037	5.3E-05	1.4E-03
9	2136	6.6E-06	5.7E-04	2139	6.3E-05	1.6E-03	2151	3.1E-05	1.0E-03
9	2320	2.1E-05	8.6E-04	2340	2.3E-04	3.9E-03	2353	7.1E-05	2.2E-03
10	0256	8.4E-06	5.4E-04	0315	1.2E-02	6.1E-02	0322	4.0E-03	2.9E-02
10	0700	4.4E-05	1.5E-03	0715	2.4E-04	4.8E-03	0728	9.6E-05	3.0E-03
10	0753	1.3E-04	3.2E-03	0803	3.8E-04	1.0E-02	0810	3.5E-04	6.4E-03
10	0953	5.3E-06	6.2E-04	0957	2.8E-05	1.0E-03	1008	1.1E-05	7.6E-04
10	1028	1.1E-05	6.4E-04	1036	1.8E-04	2.6E-03	1040	4.2E-05	1.6E-03
10	1108	6.0E-06	6.2E-04	1112	8.8E-05	1.5E-03	1114	3.3E-05	1.0E-03
10	1353	2.9E-05	1.0E-03	1356	5.5E-05	1.7E-03	1358	4.9E-05	1.3E-03
10	1452	1.3E-05	7.8E-04	1456	2.1E-04	2.7E-03	1458	4.5E-05	1.6E-03
10	1707	3.3E-05	1.1E-03	1710	3.5E-04	4.2E-03	1712	1.1E-04	2.1E-03
11	0015	5.9E-05	1.1E-03	0041	8.5E-04	7.9E-03	0058	2.0E-04	4.3E-03
11	0943	1.9E-05	8.2E-04	0947	7.0E-04	5.9E-03	0952	1.3E-04	3.1E-03
11	1717	2.2E-06	2.6E-04	1725	4.4E-05	1.1E-03	1729	1.6E-05	7.1E-04
11	1906	3.2E-06	4.3E-04	1915	1.1E-04	2.0E-03	1927	4.0E-05	1.2E-03
11	2015	2.5E-05	9.1E-04	2020	3.9E-05	1.3E-03	2032	3.0E-05	1.1E-03
11	2145	2.4E-05	6.9E-04	2206	9.6E-03	4.7E-02	2218	2.5E-03	2.3E-02
12	0737	1.4E-05	5.6E-04	0746	6.9E-05	1.7E-03	0800	2.9E-05	1.1E-03
12	1056	6.6E-06	4.5E-04	1101	1.1E-04	2.0E-03	1105	4.1E-05	1.1E-03
12	1121	8.0E-06	4.7E-04	1131	4.0E-04	4.8E-03	1145	7.4E-05	2.6E-03
12	1151	6.2E-05	2.2E-03	1155	2.4E-04	3.7E-03	1215	1.0E-04	2.9E-03
12	1420	2.1E-06	3.6E-04	1429	3.2E-04	4.5E-03	1437	7.3E-05	2.2E-03
12	1542	2.9E-06	4.5E-04	1549	1.2E-04	2.3E-03	1556	4.2E-05	1.3E-03
12	1842	5.3E-06	4.7E-04	1850	6.2E-05	1.3E-03	1853	2.0E-05	8.7E-04
13	0031	3.4E-06	3.4E-04	0038	2.7E-04	3.6E-03	0043	6.2E-05	1.8E-03
13	0134	4.6E-06	4.0E-04	0138	9.0E-05	1.8E-03	0143	3.0E-05	1.0E-03
22	2346	2.1E-09	1.5E-07	0021	6.8E-08	1.9E-06	0102	2.1E-08	9.6E-07
24	1300	6.6E-10	1.3E-07	1307	2.4E-07	2.6E-06	1310	5.2E-08	1.2E-06
24	1415	1.9E-09	1.5E-07	1420	1.7E-07	1.7E-06	1425	3.4E-08	8.3E-07
24	1606	2.3E-09	2.0E-07	1611	1.2E-07	1.8E-06	1615	2.7E-08	8.4E-07
24	2013	2.4E-09	1.7E-07	2019	3.9E-07	3.3E-06	2022	8.2E-08	1.9E-06
25	1053	5.4E-09	3.0E-07	1118	9.3E-08	1.8E-06	1145	3.4E-08	1.0E-06
25	1911	3.4E-09	2.7E-07	1919	8.0E-08	1.2E-06	1924	2.2E-08	7.6E-07
25	2135	7.2E-09	3.7E-07	2142	1.9E-07	2.7E-06	2146	8.0E-08	1.5E-06
25	2247	5.3E-09	3.1E-07	2315	1.3E-07	2.7E-06	2324	3.9E-08	1.5E-06
26	0151	3.0E-09	3.0E-07	0208	5.1E-06	3.1E-05	0237	1.6E-06	1.5E-05
26	0450	8.7E-09	5.5E-07	0456	8.9E-08	1.6E-06	0500	3.3E-08	1.0E-06
26	0625	9.5E-09	5.7E-07	0629	8.9E-08	1.9E-06	0637	4.6E-08	1.1E-06
26	1202	2.0E-08	6.4E-07	1205	4.5E-07	4.2E-06	1207	1.3E-07	2.3E-06
26	1217	1.5E-08	6.7E-07	1229	1.3E-07	2.8E-06	1256	3.7E-08	1.5E-06
26	1334	2.0E-08	8.8E-07	1337	8.0E-08	1.8E-06	1341	4.1E-08	1.2E-06
26	1537	5.3E-09	4.4E-07	1549	3.6E-08	1.1E-06	1557	1.1E-08	7.5E-07
26	1705	5.4E-09	4.1E-07	1720	5.9E-08	1.1E-06	1730	1.9E-08	7.2E-07
26	1735	1.8E-08	7.3E-07	1741	1.1E-07	2.2E-06	1746	4.5E-08	1.3E-06
26	1844	4.6E-08	1.1E-06	1905	7.7E-07	9.4E-06	1919	2.8E-07	5.2E-06
26	2156	1.6E-08	8.5E-07	2200	6.9E-08	2.0E-06	2209	4.2E-08	1.4E-06
26	2323	7.2E-09	6.1E-07	2332	6.2E-06	3.3E-05	2339	1.6E-06	1.6E-05
27	0050	4.1E-08	1.2E-06	0107	7.9E-08	2.1E-06	0112	4.7E-08	1.6E-06

SOLAR X-RAYS BY SATELLITE

GOES

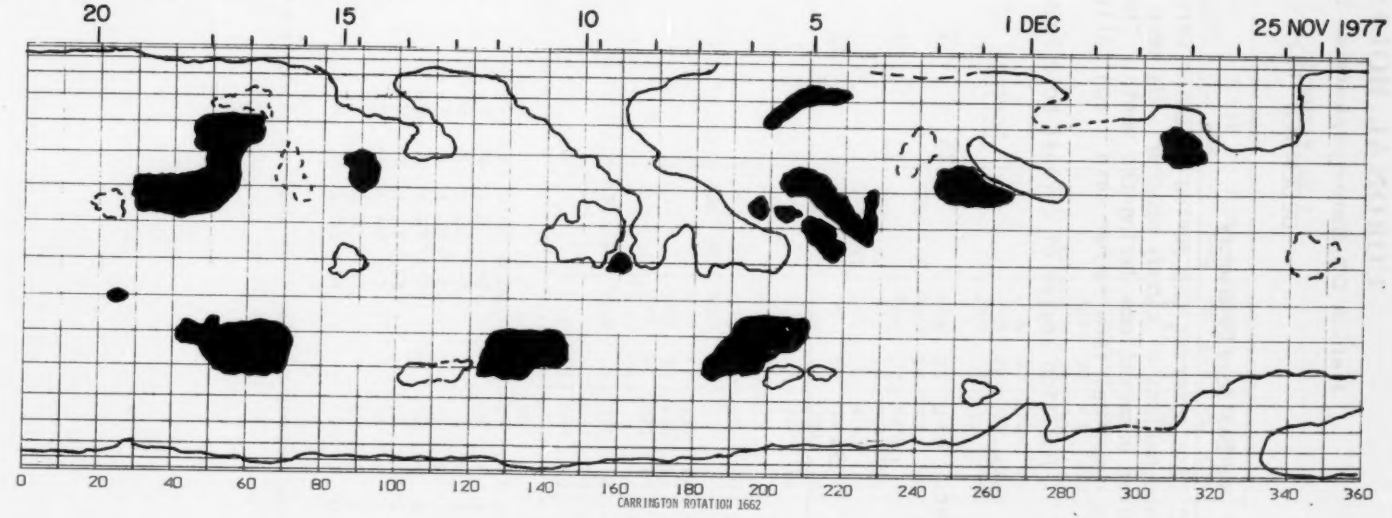
DECEMBER 1977

DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
27	0131	1.7E-08	9.0E-07	0134	7.0E-08	1.9E-06	0136	6.7E-08	1.4E-06
27	0152	4.8E-08	1.3E-06	0215	1.4E-07	3.0E-06	0222	6.3E-08	2.1E-06
27	0435	3.0E-08	1.5E-06	0444	2.5E-07	4.2E-06	0452	9.3E-08	2.8E-06
27	0659	8.2E-09	5.3E-07	0708	1.5E-06	1.0E-05	0717	2.3E-07	4.9E-06
27	1039	3.9E-08	1.2E-06	1057	1.1E-06	1.0E-05	1127	3.5E-07	5.6E-06
27	1333	1.4E-08	7.0E-07	1337	4.9E-08	1.3E-06	1340	1.5E-08	9.2E-07
27	1440	1.9E-08	8.5E-07	1450	1.1E-07	2.2E-06	1500	4.3E-08	1.5E-06
27	1839	8.4E-09	5.0E-07	1904	1.4E-07	3.2E-06	1913	4.9E-08	1.8E-06
28	0217	2.5E-09	2.5E-07	0224	1.0E-07	1.7E-06	0234	2.7E-08	9.6E-07
28	0522	5.4E-09	4.0E-07	0527	6.3E-08	1.1E-06	0532	1.8E-08	7.3E-07
28	0750	2.9E-09	3.0E-07	0755	8.8E-08	1.1E-06	0758	1.8E-08	6.3E-07
28	0825	9.9E-09	5.7E-07	0829	5.4E-08	1.7E-06	0833	3.8E-08	1.1E-06
28	0853	4.1E-08	1.2E-06	0949	1.3E-06	1.3E-05	1013	4.6E-07	6.8E-06
28	1620	6.4E-09	6.0E-07	1624	6.8E-08	1.9E-06	1632	2.9E-08	1.1E-06
28	1735	5.0E-09	4.9E-07	1738	6.2E-08	1.6E-06	1740	2.7E-08	8.7E-07
28	1958	1.8E-08	6.8E-07	2005	1.1E-07	1.9E-06	2013	4.2E-08	1.2E-06
28	2142	1.2E-08	5.9E-07	2153	8.2E-07	7.4E-06	2202	1.5E-07	3.8E-06
29	0005	8.8E-09	5.8E-07	0010	3.8E-08	1.2E-06	0012	1.9E-08	8.3E-07
29	0028	5.3E-09	4.6E-07	0049	1.4E-06	1.0E-05	0059	3.1E-07	5.3E-06
29	0630	3.0E-09	3.2E-07	0641	1.2E-07	2.1E-06	0654	3.3E-08	1.2E-06
29	0704	1.8E-08	8.7E-07	0708	6.6E-08	1.3E-06	0712	2.9E-08	1.0E-06
29	0803	7.7E-09	4.9E-07	0809	3.1E-07	2.8E-06	0813	5.4E-08	1.4E-06
29	0855	7.6E-09	4.3E-07	0907	1.1E-06	8.7E-06	0926	2.1E-07	4.5E-06
29	1052	2.1E-08	9.4E-07	1057	1.9E-07	2.7E-06	1100	6.2E-08	1.6E-06
29	1136	1.4E-08	8.6E-07	1142	1.4E-06	9.4E-06	1145	2.1E-07	4.3E-06
29	1310	1.4E-08	7.7E-07	1313	3.9E-08	1.1E-06	1315	1.8E-08	8.1E-07
29	1422	4.3E-09	4.5E-07	1428	2.5E-07	2.8E-06	1431	7.0E-08	1.5E-06
29	1633	2.9E-08	9.8E-07	1645	5.1E-07	2.3E-06	1659	4.1E-08	1.6E-06
29	1923	1.2E-08	6.4E-07	1926	3.3E-08	1.0E-06	1928	1.5E-08	7.7E-07
29	2053	6.0E-09	4.5E-07	2057	5.6E-08	1.2E-06	2100	1.6E-08	7.1E-07
30	0405	2.8E-09	3.1E-07	0414	1.1E-06	9.6E-06	0416	1.0E-07	2.5E-06
30	0927	1.6E-08	6.5E-07	0934	3.8E-08	1.1E-06	0945	1.9E-08	9.1E-07
30	1002	1.0E-08	5.8E-07	1006	6.5E-08	1.9E-06	1008	2.9E-08	9.8E-07
30	1019	8.0E-09	6.5E-07	1024	6.7E-07	5.8E-06	1026	7.3E-08	2.2E-06
30	1250	7.5E-09	4.5E-07	1255	1.2E-06	8.3E-06	1257	3.5E-07	4.3E-06
30	2206	2.8E-09	3.6E-07	2209	1.5E-05	2.0E-06	2213	4.2E-09	4.2E-07
30	2242	2.5E-09	3.3E-07	2250	7.8E-08	1.8E-06	2258	3.8E-08	1.0E-06
31	0342	1.8E-08	7.8E-07	0349	4.9E-08	1.3E-06	0354	2.6E-08	1.0E-06
31	0903	5.6E-09	4.9E-07	0908	3.6E-07	3.8E-06	0910	4.7E-08	1.5E-06
31	1915	5.7E-09	5.0E-07	1926	2.1E-07	3.3E-06	1931	4.4E-08	1.7E-06
31	2140	2.8E-09	4.4E-07	2143	1.3E-08	1.4E-06	2145	4.9E-09	4.7E-07
31	2149	4.1E-09	4.6E-07	2153	5.2E-08	1.0E-06	2157	2.1E-08	7.4E-07
31	2325	2.5E-09	4.0E-07	2338	1.7E-06	1.3E-05	2348	2.9E-07	6.3E-06

HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1662

KITT PEAK NATIONAL OBSERVATORY



27
Dec 77

CORONAL HOLES

Helium D3 Chromosphere at Solar Limb

DECEMBER 1977

Big Bear Solar Observatory

D3 limb observations during December were severely limited by long periods of cloudy weather. We were able to make only three observations during the month. These data are presented in numerical form rather than graphically.

Position angles of coronal hole boundaries (in degrees)

Date	North		South	
Dec. 4	25	- 3	-150	160
" 10	23	-12	-152	158
" 30	27	-33	-153	147

SOLAR WIND

Interplanetary Scintillations

DECEMBER 1977

UCSD 74 MHZ SCINTILLATIONS

DAY	3C48 VEL	3C48 ERR	3C144 VEL	3C144 ERR	3C147 VEL	3C147 ERR	3C161 VEL	3C161 ERR	3C237 VEL	3C237 ERR	3C273 VEL	3C273 ERR	3C298 VEL	3C298 ERR	3C459 VEL	3C459 ERR
1	368	27									415	4	360	7	339	67
2	477	9					409	7	434	11	473	4	463	19	435	2
3	406	3							390	21	408	13	437	6	338	13
4											402	4	399	6		
5	431	5									321	35	459	30	391	40
6	448	10							323	88	298	33	380	4	379	26
7	379	38									329	4	344	5	489	111
8	433	13									316	33	342	22		
9	356	38									278	72	330	28		
10											297	4	371	8	315	22
11	410	19													462	63
12	440	4									406	23	393	4		
13	388	60							300	4	450	10	480	48	536	148
14											561	*	519	*		
15									538	10	341	19	426	39		
16									318	45	395	3	428	4		
17									265	26	301	53	396	5		
18									337	9	356	4	384	10		
19	328	4									331	4	338	16		
20															461	*
21															568	*
22									277	33	353	25	328	43	208	*
23	233	8							230	43	322	22			392	44
24	364	17									204	11	435	12	293	*
25											400	86	265	21	375	32
26	443	82									355	23	271	15		
27	320	26									359	38			398	67
28									451	29	368	5	330	4		
29	355	11											261	5	277	47
31											416	75	341	12		

DECEMBER 5	UT	LAT	DIST	DLON	15 UT	LAT	DIST	DLON	25 UT	LAT	DIST	DLON
3C48	5.	6.	1.23	-8.	4.	5.	1.21	-9.	4.	4.	1.17	-11.
3C144	9.	0.	1.30	2.	8.	-1.	1.30	-0.	7.	-2.	1.30	-2.
3C147	8.	5.	1.27	3.	7.	4.	1.28	1.	7.	3.	1.27	-1.
3C161	10.	-7.	1.25	4.	10.	-8.	1.27	2.	9.	-8.	1.27	-0.
3C237	14.	-2.	1.11	15.	13.	-3.	1.15	14.	12.	-4.	1.19	12.
3C273	16.	0.	0.93	22.	15.	-1.	0.99	17.	14.	-2.	1.04	17.
3C298	18.	13.	0.73	41.	17.	7.	0.83	32.	16.	3.	0.91	23.
3C459	2.	4.	1.08	-15.	2.	3.	1.03	-16.	1.	2.	0.98	-17.

*Indicates data for which no error estimate is available since only two antennas were operating.

INFERRED IP MAGNETIC FIELD

BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1951	APR 3							*				*								AT	TA	T*	T*			*	AT	TA	A*	
1952	APR 30		AT					TA	AT	T*	-			-	-	-				A*	TA	AT	AT			A*			-	
1953	MAY 27	-						*	TA						-	*			-					T*						
1954	JUN 23						AT			AT		TA	T*	AT			TA	A*					AT	A*		TA	AT	AT		A*
1955	JUL 20		T*								TA	A*								AT	T*	TA	TA	TA	-	TA	TA			
1956	AUG 16							TA	T*							*		AT				-	AT	-	AT	-	AT	-	TA	-		-	-	-
1957	SEP 12	-	-	AT	-	-	-	-	-	-	-	AT	-	-	AT	-	AT	-	-	-	-					AT					-		
1958	OCT 9	AT	*	A*		A*		*			TA		A*			*	-	-	-	*		TA		AT		AT	-				AT		
1959	NOV 5		AT	TA			TA		T*		*	AT	*			*	-													*		
1960	DEC 2							TA			*					AT			*					-	*			-	TA	-		
1961	DEC 29		-	AT	-	*	*	*						*		*	A*		*	*				*						AT		
1962	1977 JAN 25				-			-	TA	-		A*		AT	-		*	-			*	-			TA							
1963	FEB 21	AT		-	-	-	TA		TA				*								-			-								
1964	MAR 20			TA		AT					*			-	-					A*				-								
1965	APR 16				TA			TA	-	AT	TA						-	-	TA		AT	AT			TA					AT		
1966	MAY 13	TA		-	-			TA													AT		-	-	AT	T*	-	T*			AT	AT	-	
1967	JUN 9								TA			-									AT	A*					A*				TA	TA	
1968	JUL 6											A*			T*		TA	TA		T*			AT					-		AT		-	
1969	AUG 2		TA						TA	-				TA	*									AT	TA							
1970	AUG 29				-		-		-		TA								AT		AT			AT		TA		-	AT		AT		
1971	SEP 25							-		-		-						TA				TA											
1972	OCT 22						-	AT														AT	AT							*			
1973	NOV 18			TA		AT						-		AT							*				*				*				
1974	DEC 15					-		-			AT	-				AT		AT															

[ ] = definitely towards the sun [ ] = definitely away from the sun

T = towards the sun A = away from the sun * = effect doubtful or not discernible - = missing data

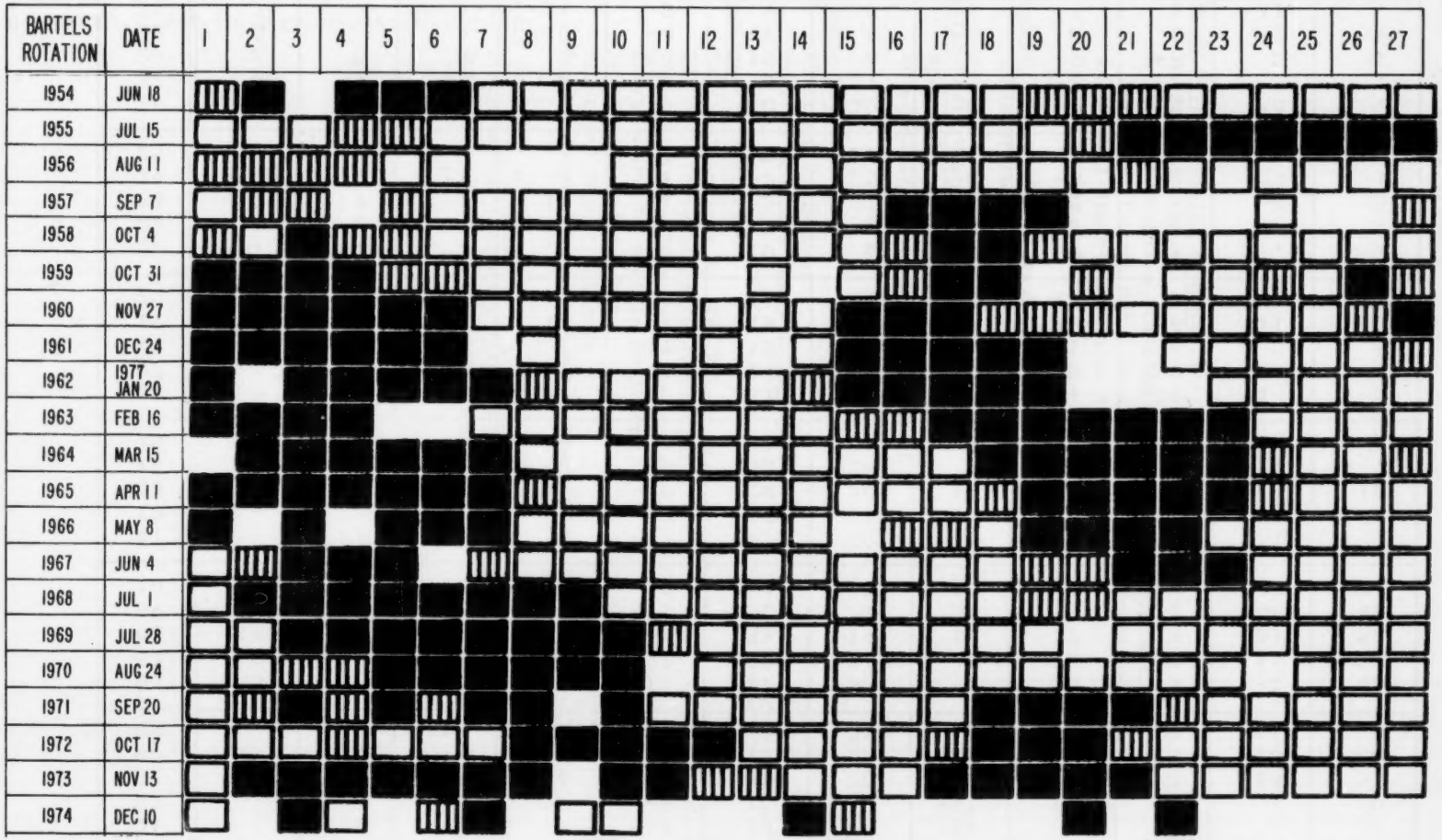
The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.

Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this Table in SGD issues 385 Part I through 389 Part I.

Errata: Thule data for December 5, 6, 10, 11, 12 and 19, 1976 have been corrected.

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.
Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this Table in SGD issues 385 Part I through 389 Part I.
Errata: Thule data for December 5, 6, 10, 11, 12 and 19, 1976 have been corrected.

STANFORD MEAN SOLAR MAGNETIC FIELD



POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: □ = FIELD >2μT, ▥ = -2μT ≤FIELD ≤2μT, ■ = FIELD <-2μT

No box visible indicates no data available for that day.

Note: Data are taken daily at 2000 UT. Dates given are not Bartels Rotation dates. These earlier dates correspond to the occurrence of phenomena on the sun which affect the Earth during the given Bartels Rotation.

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

1977

DAY	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
01	.	5	2	-7	-13	13	2	-16	-9	9	6	-14
02	.	0	0	-17	-6	15	-12	-23	-13	6	1	-10
03	4	-6	-2	-16	-5	15	-18	-25	.	3	-14	-7
04	15	-8	-9	-12	1	13	-26	-23	3	13	-16	8
05	.	-11	-17	-9	7	0	-31	-16	12	13	-11	26
06	3	-17	-22	-4	11	-19	-33	-5	18	11	-1	46
07	-7	-12	-20	0	7	-32	-26	-1	22	-6	11	55
08	-14	.	-13	5	-5	-31	-14	11	17	-13	31	53
09	-9	.	-9	8	.	.	-7	25	8	-13	46	46
10	-11	.	-3	2	-22	0	3	20	4	-4	48	26
11	-8	21	3	-4	.	7	20	17	6	2	51	.
12	.	19	11	-7	-29	17	29	12	13	12	32	-2
13	.	13	18	-14	-20	28	30	11	19	28	14	10
14	8	11	3	-8	-5	38	24	5	23	35	-4	.
15	6	9	.	-8	4	40	26	7	40	46	-10	1
16	9	-3	-9	-11	12	31	18	.	.	39	-18	-6
17	6	-12	-12	-9	20	24	13	5	38	20	-24	.
18	3	-13	-13	1	29	18	4	13	41	6	-5	6
19	0	-20	-15	13	27	19	1	19	31	6	-11	8
20	-4	.	-12	18	19	16	-1	23	17	1	-12	.
21	.	.	-7	21	12	10	6	24	2	3	.	.
22	-14	3	2	13	.	2	9	22	-3	7	-7	.
23	-12	7	.	17	1	-2	22	18	-2	3	-4	-5
24	-12	12	15	9	-1	-7	25	8	-6	-3	0	-1
25	-7	13	13	6	4	-15	31	4	-1	-9	2	.
26	-6	11	13	9	-10	-10	30	0	-3	-5	4	.
27	0	9	10	7	-10	4	24	2	-8	-5	7	.
28	6	5	8	2	-10	15	6	-2	.	-6	5	.
29	8		4	-10	-4	19	4	-6	-8	5	-2	-9
30	7		7	-11	3	14	-4	-6	3	6	-11	.
31	7		6		6		-10	-11		8		-20

Dot symbol entry indicates no data available for the day.

NOVEMBER 1977 DATA

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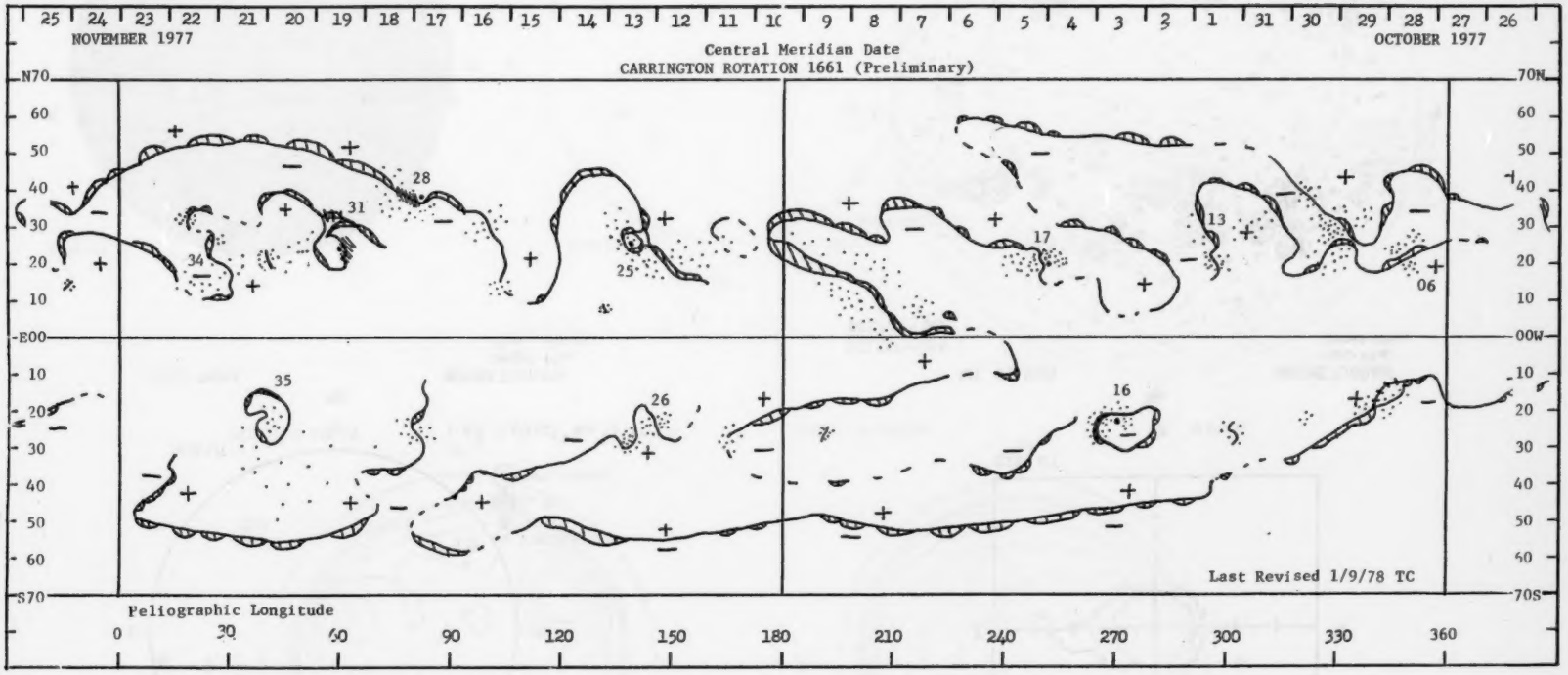
Dot symbol entry indicates no data available for the day.

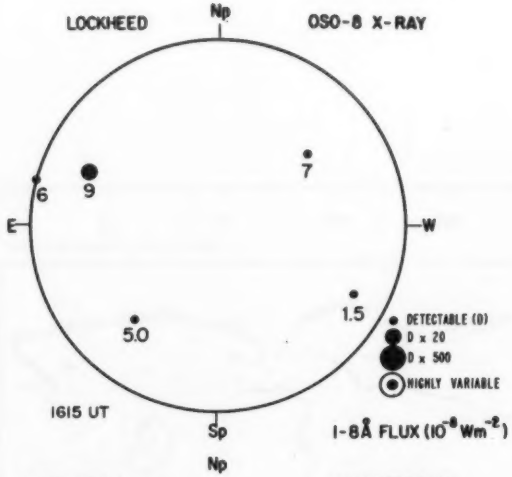
Hα SYNOPTIC CHART

CARRINGTON ROTATION 1661 (PRELIMINARY)



NOVEMBER 1, 1977 (P = 24.56, B_o = 4.36, L_o = 304.21)

LOCKHEED OSO-8 X-RAY

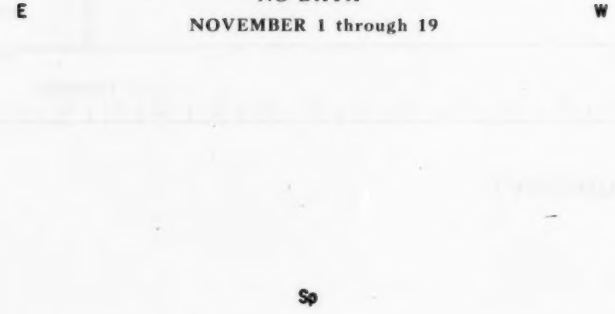


1615 UT

1-8Å FLUX (10^{-8} Wm^{-2})

KITT PEAK

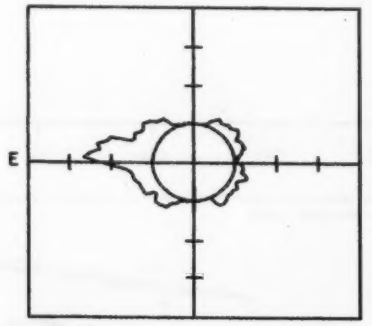
MAGNETOGRAM
Bright - Plus
Dark - Minus



NO DATA
NOVEMBER 1 through 19

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

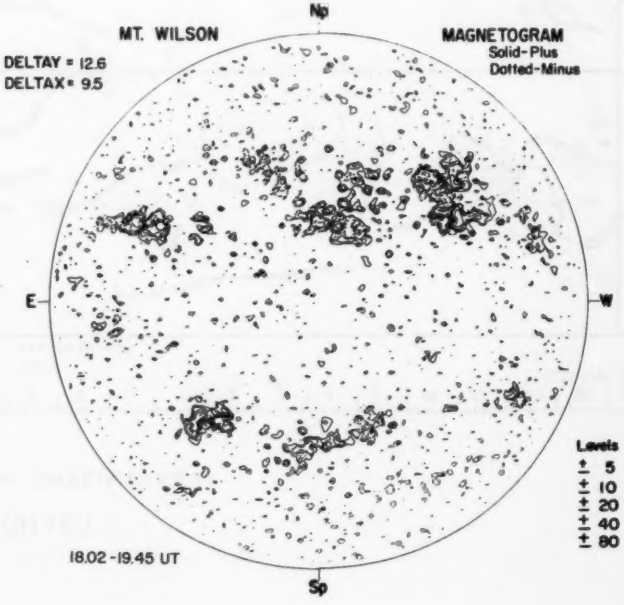


2239 UT

MT. WILSON

MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.6
DELTAX = 9.5



18.02 - 19.45 UT

Sp

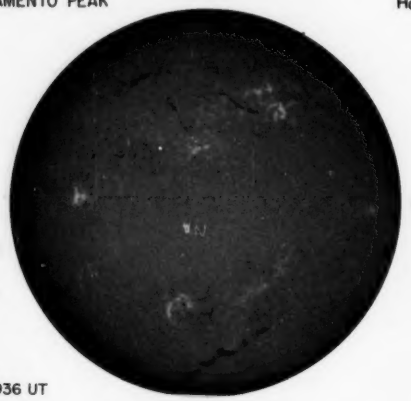
Sp

01

SACRAMENTO PEAK

Np

Hα



E

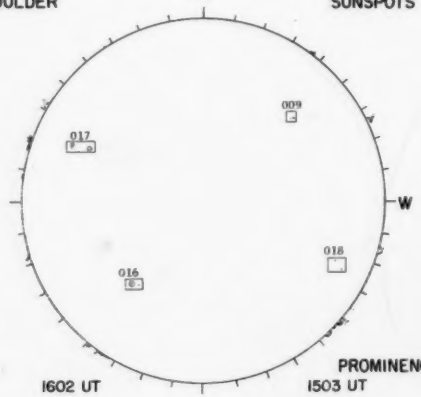
W

1936 UT

Sp

BOULDER

Np



E

W

1602 UT

Sp

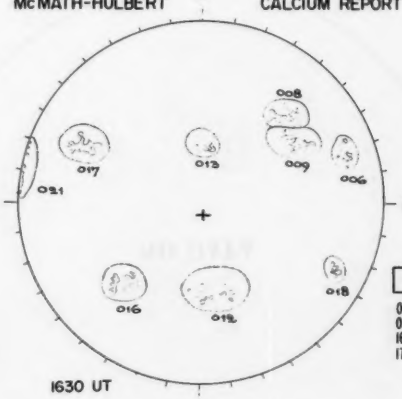
SUNSPOTS

PROMINENCES

1503 UT

McMATH-HULBERT

Np



E

W

1630 UT

Sp

CALCIUM REPORT

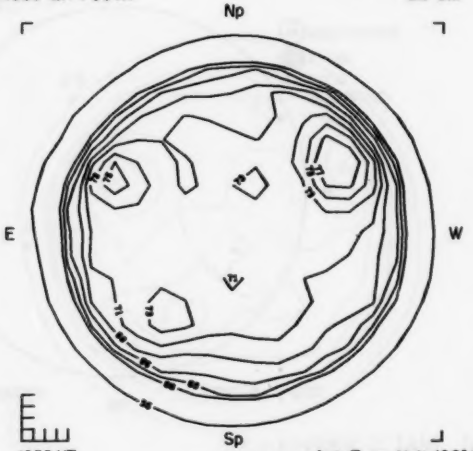
GOOD	M

08 -1200 - 25
09 -1200 - 25
16 -1700 - 30
17 -1700 - 30

NOSC LA POSTA

2.0 CM

Np



E

W

1958 UT

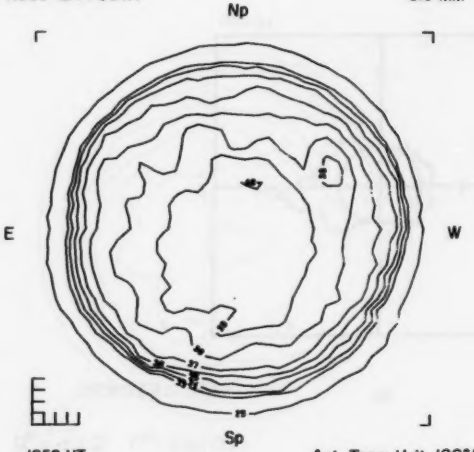
Sp

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E

W

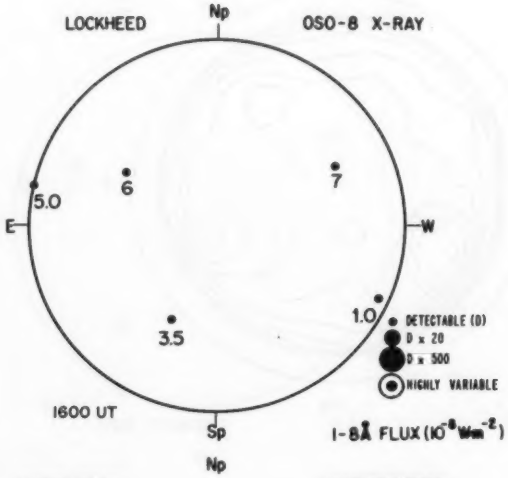
1859 UT

Sp

Ant. Temp. Unit 100°K

NOVEMBER 2, 1977 (P = 24.39, B_o = 4.25, L_o = 291.02)

LOCKHEED OSO-8 X-RAY

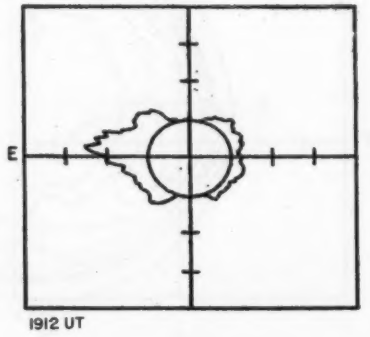


1-8Å FLUX (10^{-8} Wm^{-2})

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

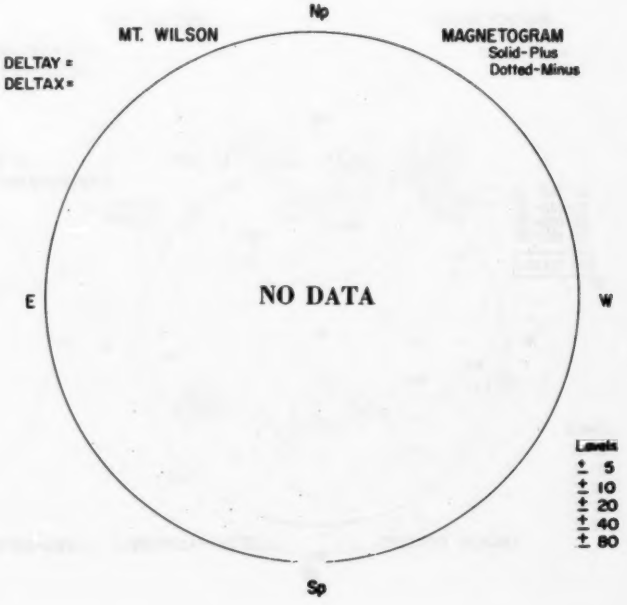
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



Sp

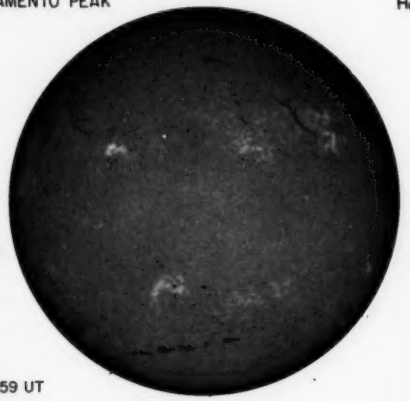
Sp

02

SACRAMENTO PEAK

Np

Hα



E

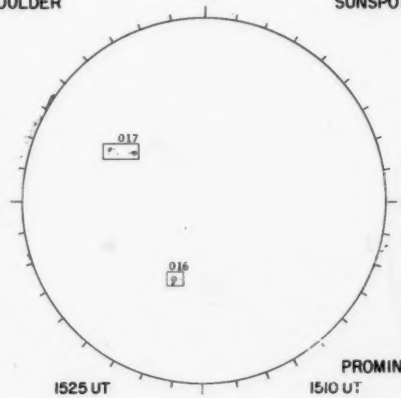
W

1859 UT

Sp

BOULDER

Np



E

W

1525 UT

Sp

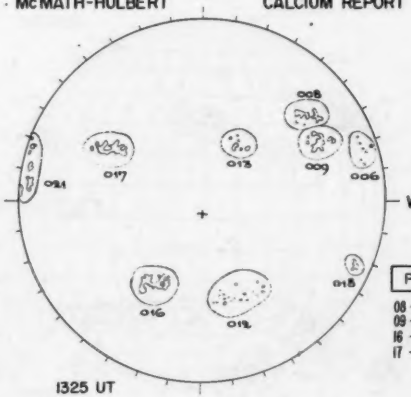
SUNSPOTS

1510 UT

PROMINENCES

McMATH-HULBERT

Np



E

W

1325 UT

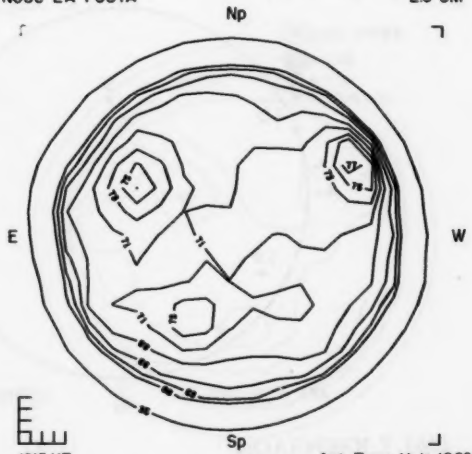
Sp

CALCIUM REPORT

NOSC LA POSTA

2.0 CM

Np



E

W

1915 UT

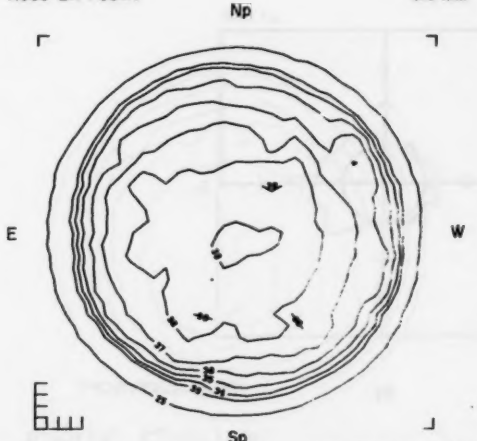
Sp

Ant Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E

W

1809 UT

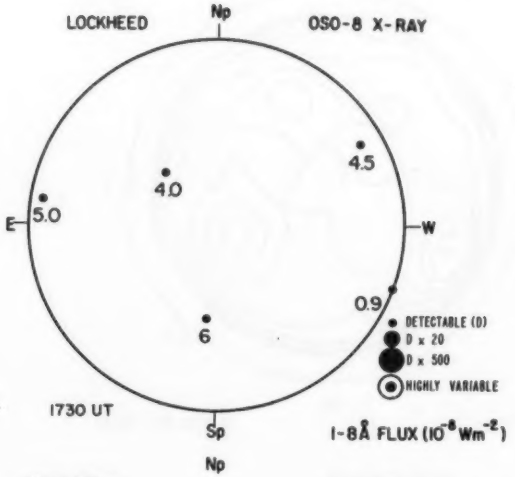
Sp

Ant. Temp. Unit 100°K

NOVEMBER 3, 1977 (P = 24.21, B_o = 4.15, L_o = 277.84)

LOCKHEED

OSO-8 X-RAY



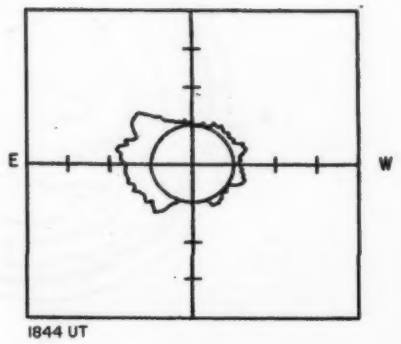
1-8Å FLUX (10^{-6} Wm^{-2})

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

SACRAMENTO PEAK

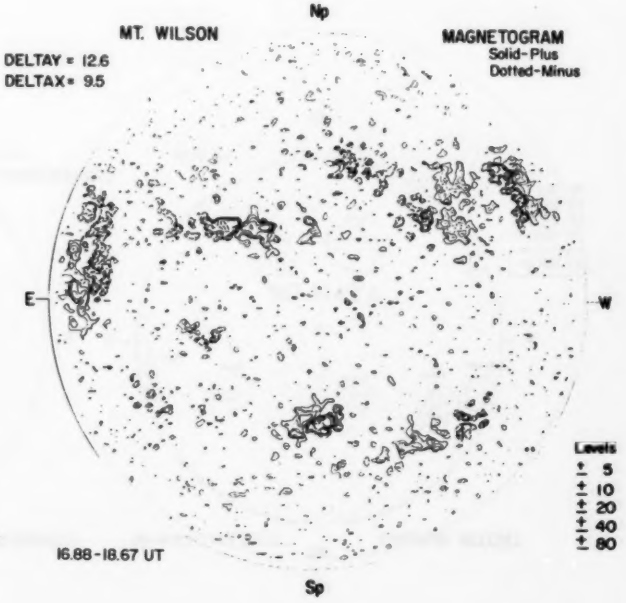
CORONA (1.15 $R_\odot$)
5303 Å



MT. WILSON

DELTAY = 12.6
DELTAX = 9.5

MAGNETOGRAM
Solid - Plus
Dotted - Minus



Sp

16.66-16.67 UT

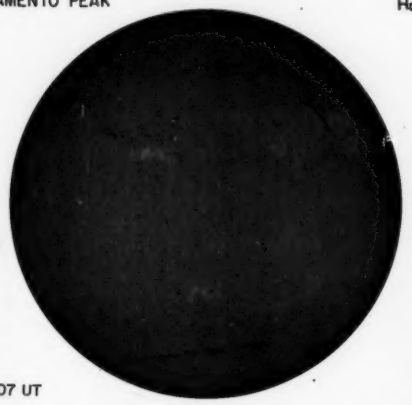
Sp

03

SACRAMENTO PEAK

Np

Hα



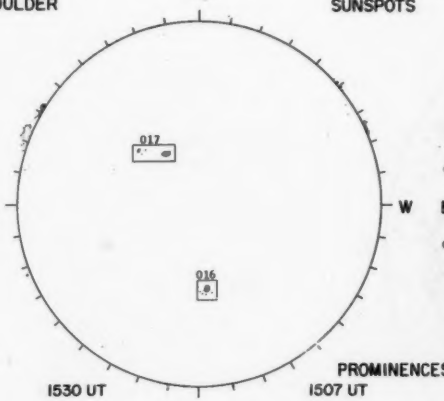
E W

1707 UT

Sp

BOULDER

Np



E W

1530 UT

Sp

SUNSPOTS

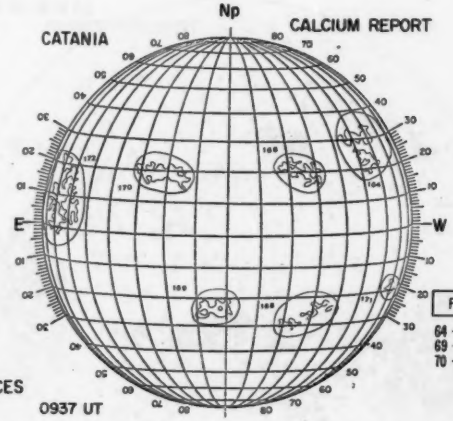
1507 UT

PROMINENCES

CATANIA

Np

CALCIUM REPORT



E W

0937 UT

Sp

FAIR GD

64 - 3570 - --

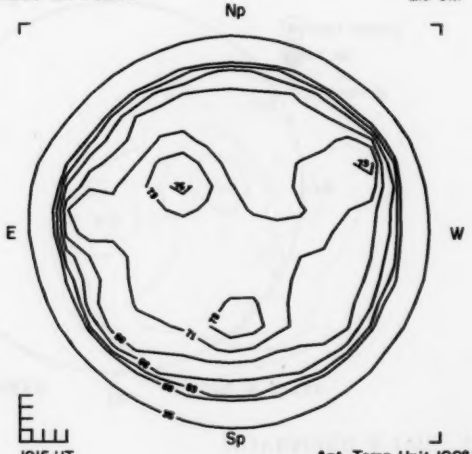
69 - 1434 - --

70 - 3152 - --

NOSC LA POSTA

2.0 CM

Np



E W

Sp

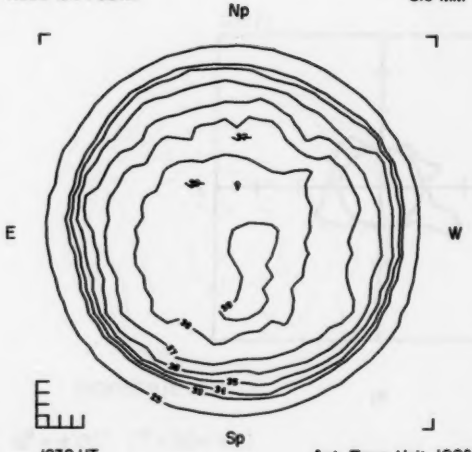
1915 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E W

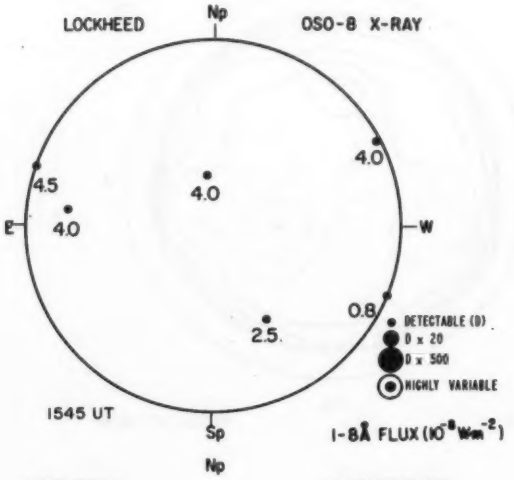
Sp

1838 UT

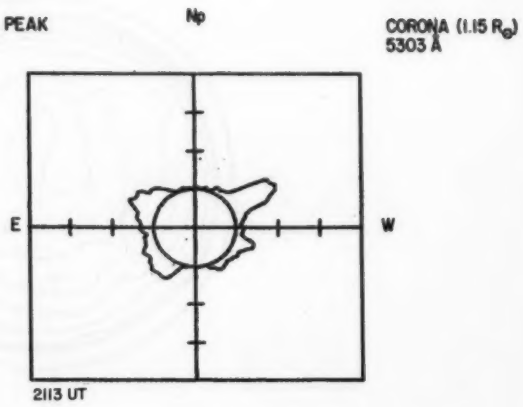
Ant. Temp. Unit 100°K

NOVEMBER 4, 1977 (P = 24.02, B_o = 4.05, L_o = 264.65)

LOCKHEED OSO-8 X-RAY



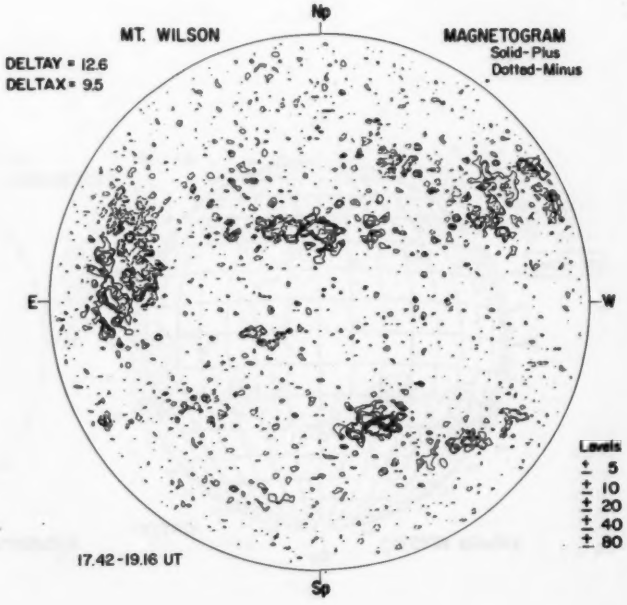
SACRAMENTO PEAK



KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

MT. WILSON



MAGNETOGRAM
Solid - Plus
Dotted - Minus

Sp

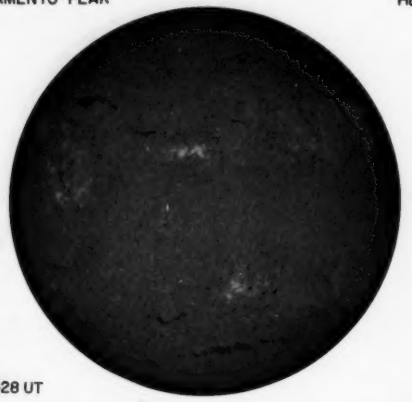
Sp

04

SACRAMENTO PEAK

Np

Hα



E

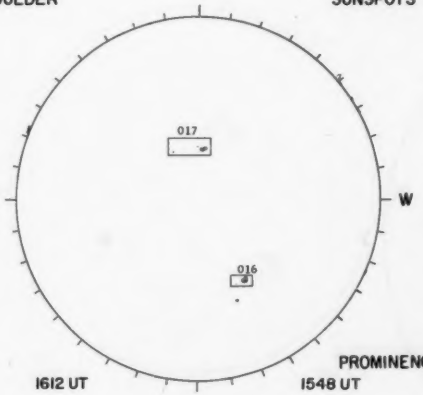
W

1528 UT

Sp

BOULDER

Np



E

W

1612 UT

Sp

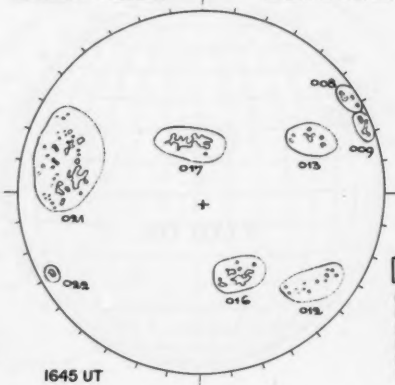
SUNSPOTS

1548 UT

PROMINENCES

McMATH-HULBERT

Np



E

W

1645 UT

Sp

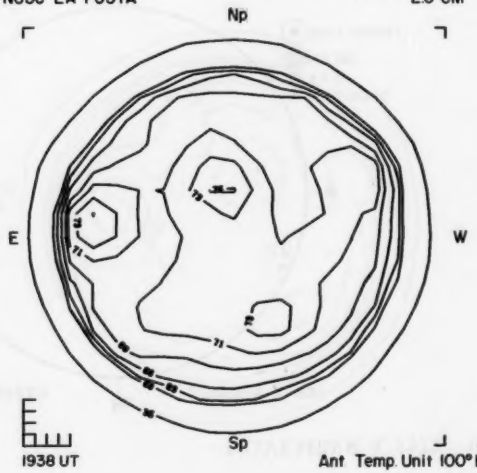
CALCIUM REPORT

FAIR	S
08 - 1000 - 30	
09 - 1000 - 25	
16 - 1500 - 30	
17 - 1600 - 30	
21 - 2500 - 30	
22 - 0400 - 25	

NOSC LA POSTA

2.0 CM

Np



E

W

Sp

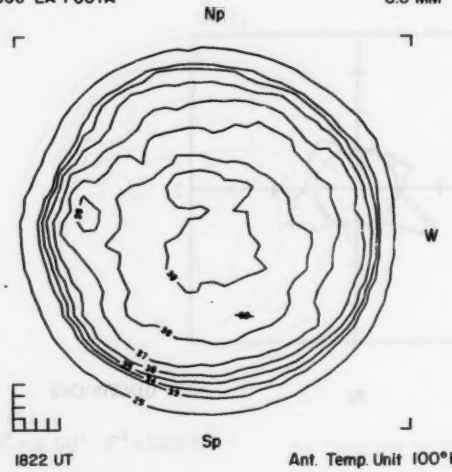
1938 UT

Ant Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E

W

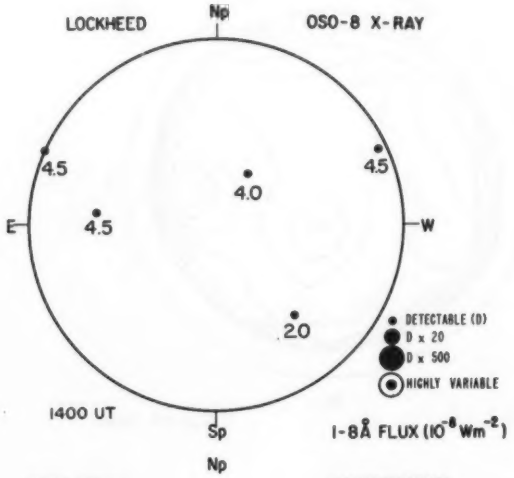
Sp

1822 UT

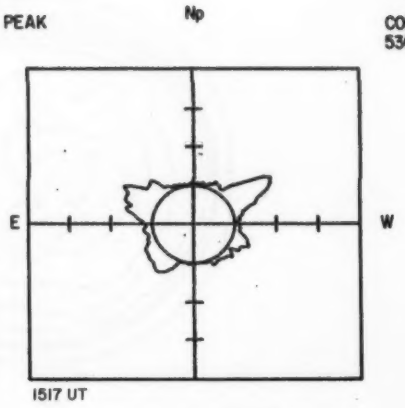
Ant. Temp. Unit 100°K

NOVEMBER 5, 1977 (P = 23.83, B_0 = 3.94, L_0 = 251.46)

LOCKHEED OSO-8 X-RAY

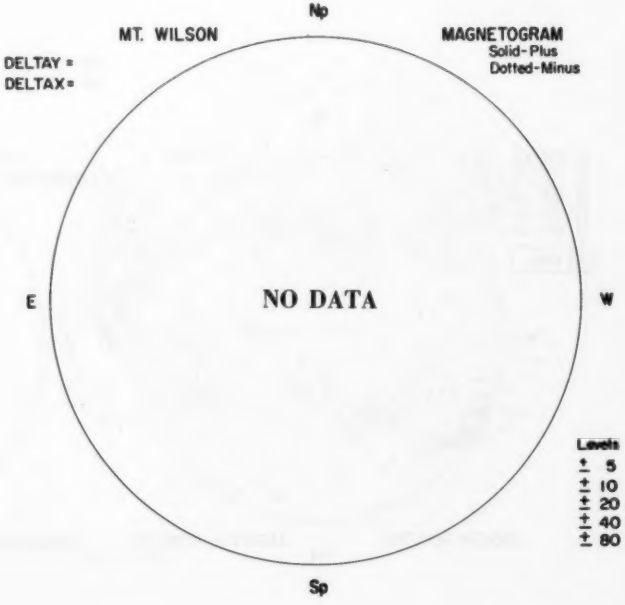


SACRAMENTO PEAK



KITT PEAK

MT. WILSON



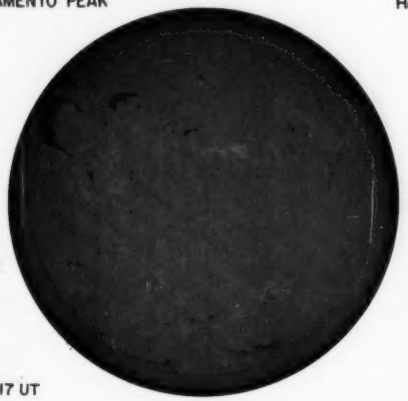
Sp

Sp

05

SACRAMENTO PEAK

Np



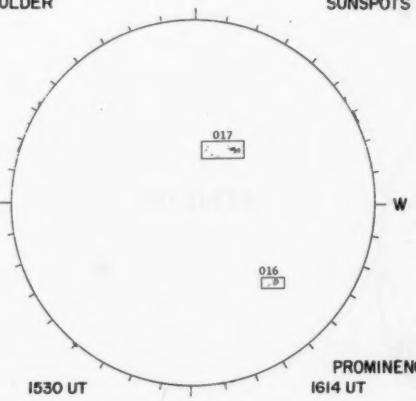
E W

1517 UT

Sp

Hα BOULDER

Np



E W

1530 UT

Sp

SUNSPOTS

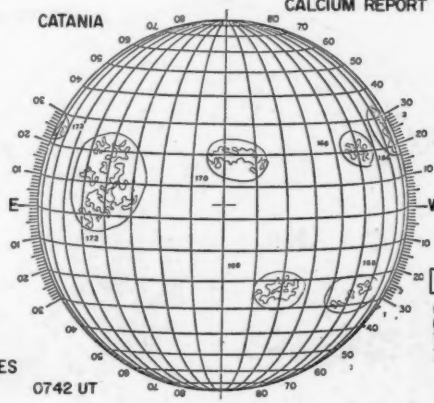
PROMINENCES

1614 UT

CATANIA

Np

CALCIUM REPORT



E W

0742 UT

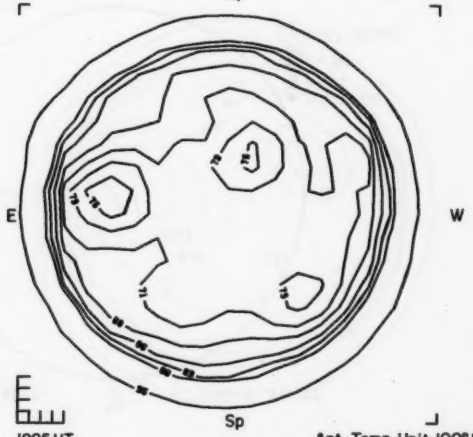
Sp

	FAIR	GD
64 - 3139 -		
69 - 2030 -		
70 - 2204 -		
72 - 7404 -		

NOSC LA POSTA

2.0 CM

Np



E W

1905 UT

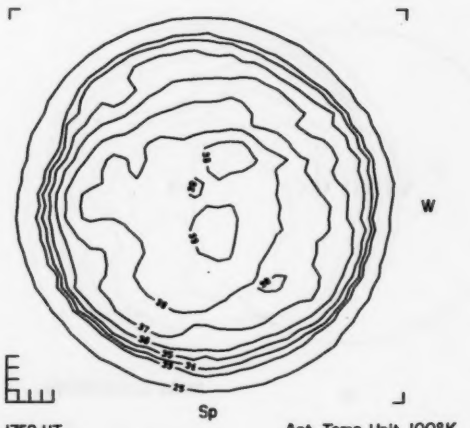
Sp

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E W

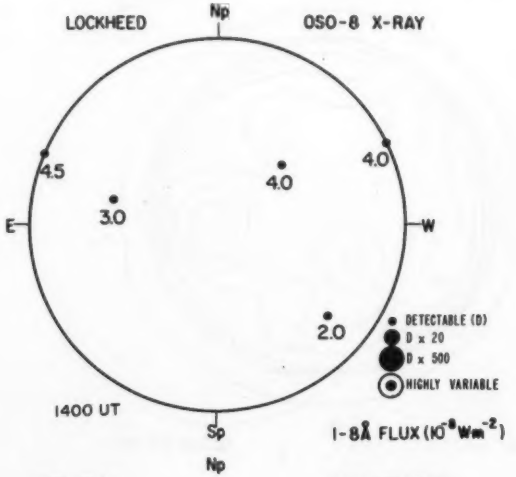
1752 UT

Sp

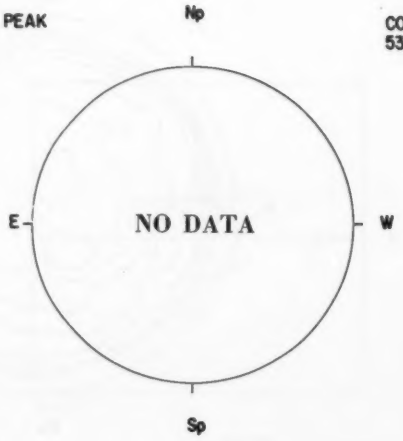
Ant. Temp. Unit 100°K

NOVEMBER 6, 1977 (P = 23.63, B_o = 3.83, L_o = 238.28)

LOCKHEED OSO-8 X-RAY

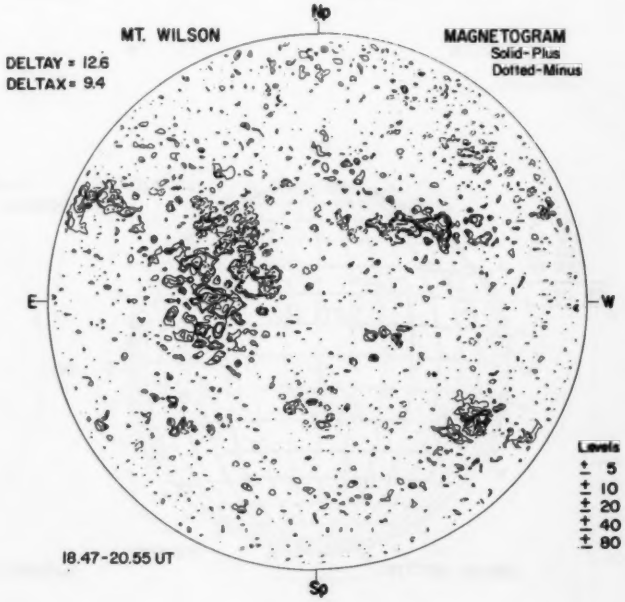


SACRAMENTO PEAK



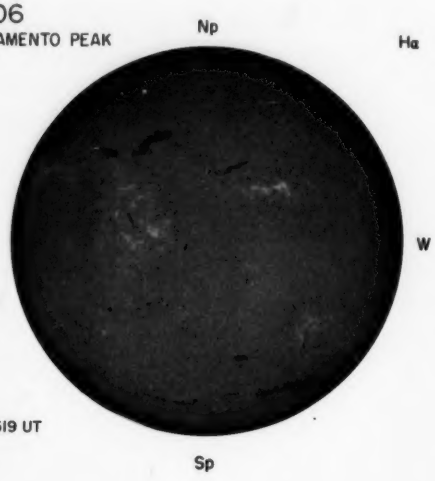
KITT PEAK

MT. WILSON



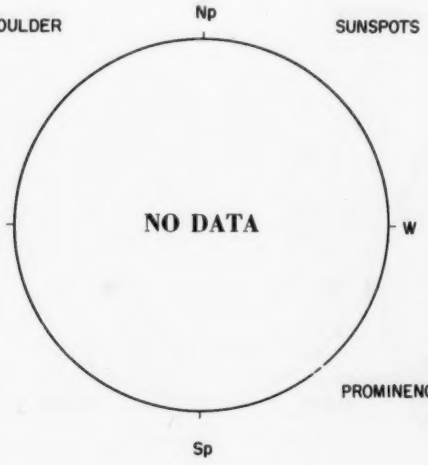
06

SACRAMENTO PEAK



1519 UT

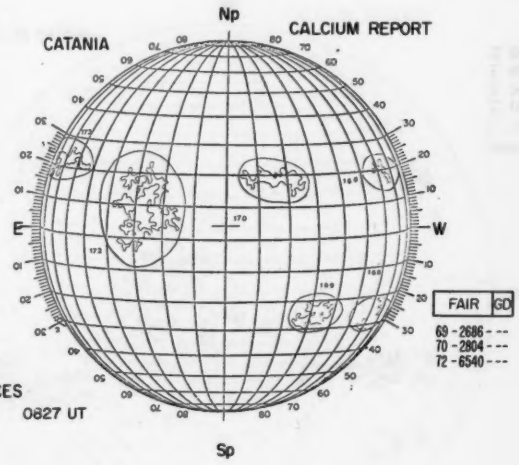
Hα BOULDER



SUNSPOTS

CATANIA

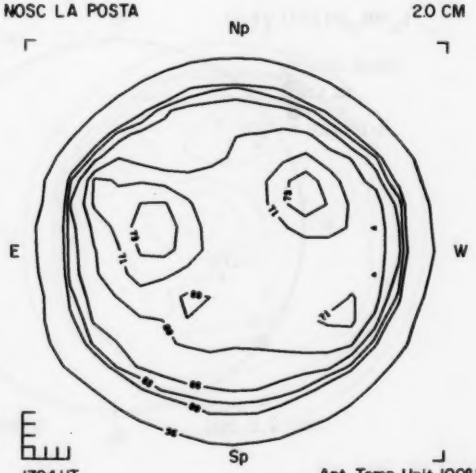
CALCIUM REPORT



PROMINENCES

0827 UT

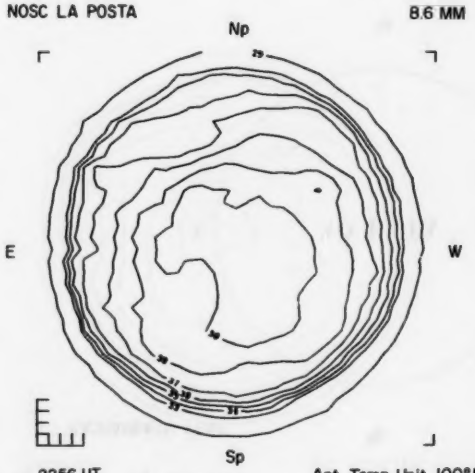
NOSC LA POSTA 2.0 CM



1704 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



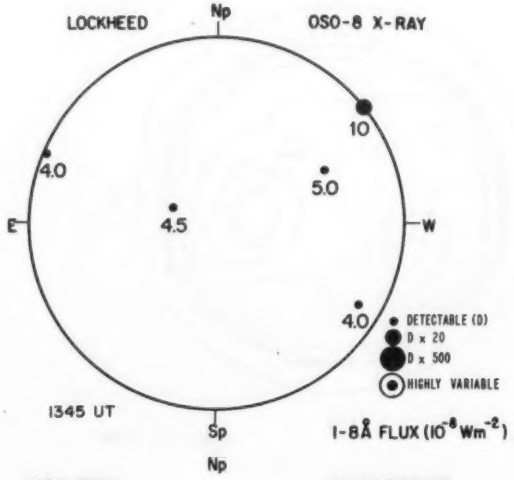
2256 UT

Ant. Temp. Unit 100°K

NOVEMBER 7, 1977 (P = 23.42, B_o = 3.73, L_o = 225.10)

LOCKHEED

OSO-8 X-RAY

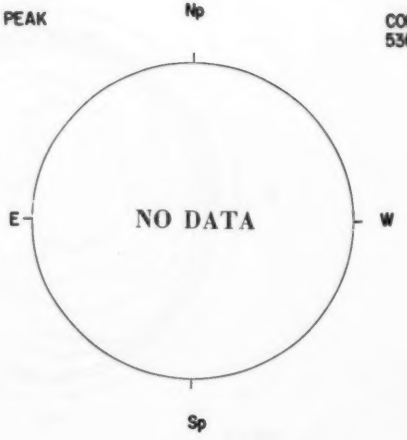


KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

SACRAMENTO PEAK

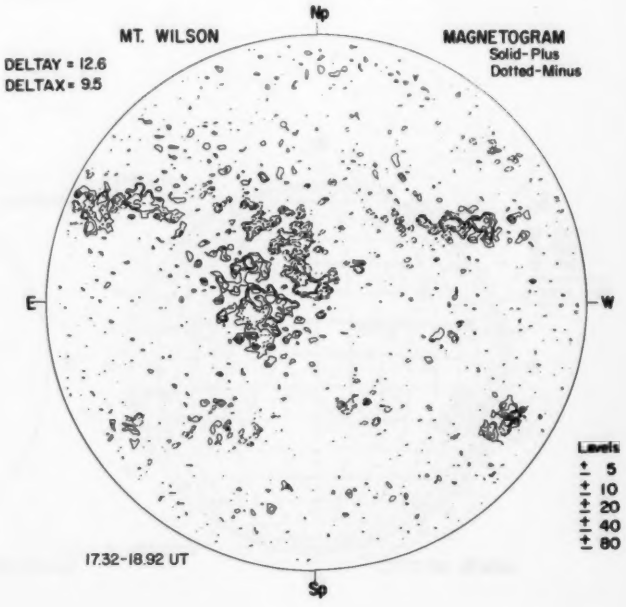
CORONA (1.15 $R_\odot$)
5303 Å



MT. WILSON

DELTAY = 12.6
DELTAX = 9.5

MAGNETOGRAM
Solid - Plus
Dotted - Minus



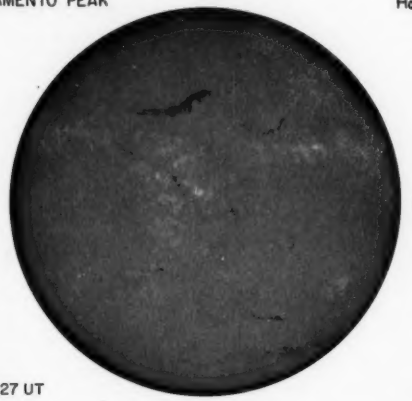
Sp

Sp

07

SACRAMENTO PEAK

Np



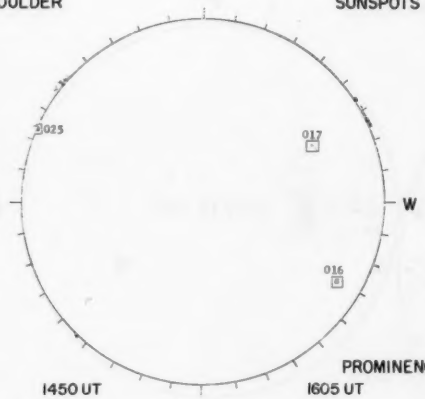
E W

1627 UT

Sp

Hα BOULDER

Np



E W

1450 UT

Sp

SUNSPOTS

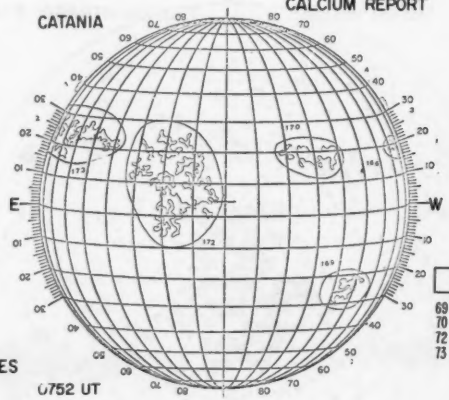
PROMINENCES

1605 UT

CATANIA

Np

CALCIUM REPORT



E W

0752 UT

Sp

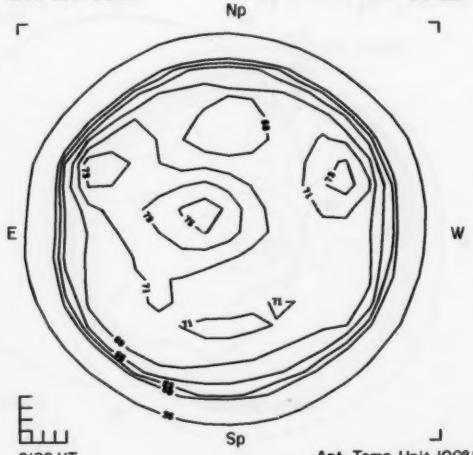
FAIR	GD

69 - 1725 - - -
70 - 2701 - - -
72 - 6365 - - -
73 - 6459 - - -

NOSC LA POSTA

2.0 CM

Np



E W

2126 UT

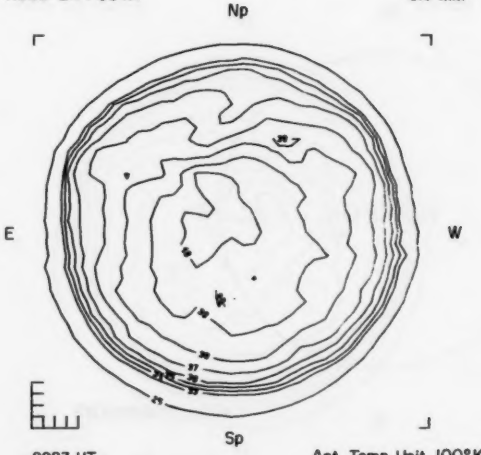
Sp

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E W

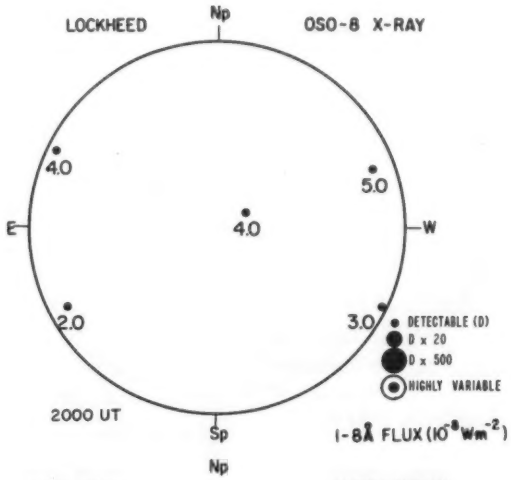
2023 UT

Sp

Ant. Temp. Unit 100°K

NOVEMBER 8, 1977 (P = 23.20, B_o = 3.62, L_o = 211.91)

LOCKHEED OSO-8 X-RAY

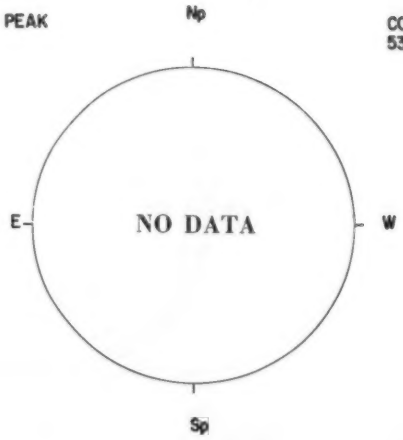


KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

SACRAMENTO PEAK

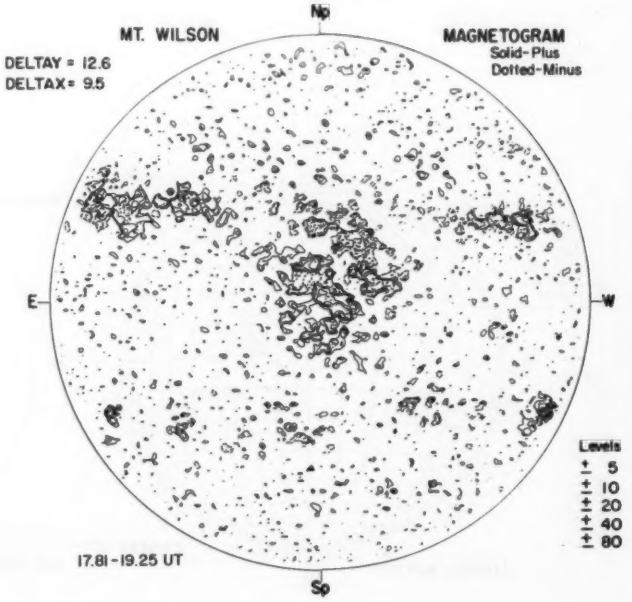
CORONA (1.15 $R_\odot$)
5303 Å



MT. WILSON

MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY = 12.6
DELTAX = 9.5



17.81 - 19.25 UT

Sp

08

SACRAMENTO PEAK Hα

Np

E NO DATA W

Sp

BOULDER SUNSPOTS

Np

E NO DATA W

Sp

McMATH-HULBERT CALCIUM REPORT

Np

E NO DATA W

Sp

PROMINENCES

NOSC LA POSTA 2.0 CM

Np

E W

Sp

1021 UT

Ant Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

Np

E W

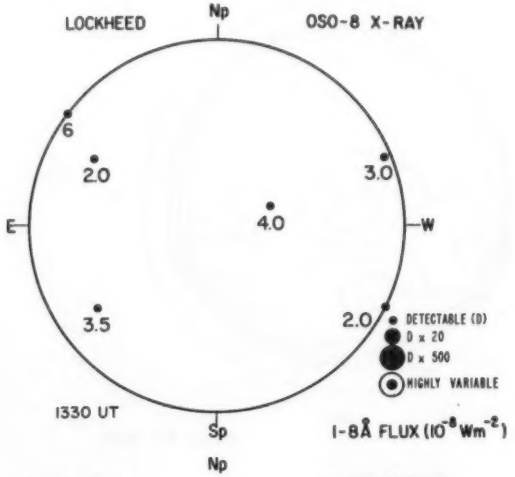
Sp

1811 UT

Ant. Temp. Unit 100°K

NOVEMBER 9, 1977 (P = 22.98, B_o = 3.51, L_o = 198.73)

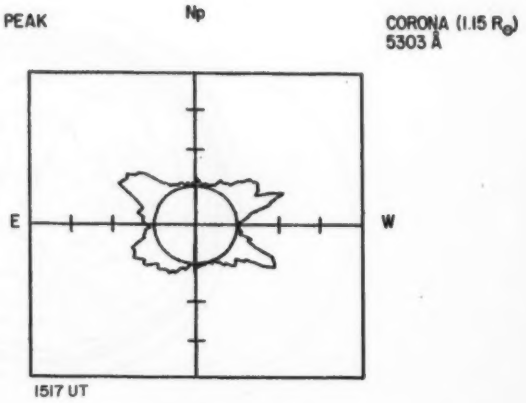
LOCKHEED OSO-8 X-RAY



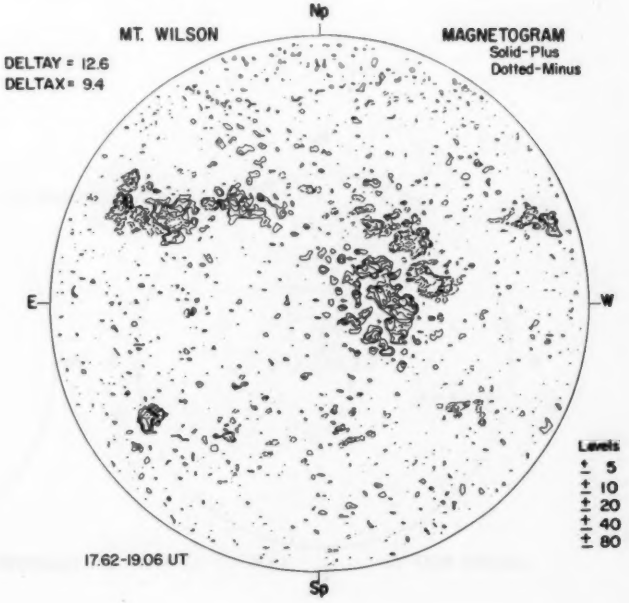
KITT PEAK

MAGNETOGRAM
Bright- Plus
Dark - Minus

SACRAMENTO PEAK



MT. WILSON



Sp

Sp

09

SACRAMENTO PEAK

Np

Ha

E

W

1534 UT

Sp

BOULDER

Np

SUNSPOTS

025

026

E

W

1610 UT

Sp

PROMINENCES

1550 UT

CATANIA

Np

CALCIUM REPORT

E

W

FAIR GD

69 - 2171 - - -
70 - 2549 - - -
72 - 6457 - - -
73 - 6614 - - -

1015 UT

Sp

NOSC LA POSTA

2.0 CM

Np

E

W

Sp

1855 UT

Ant. Temp. Unit 100° K

NOSC LA POSTA

8.6 MM

Np

E

W

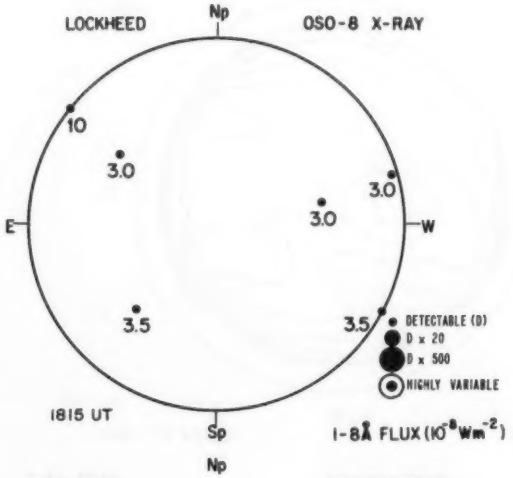
Sp

1757 UT

Ant. Temp. Unit 100° K

NOVEMBER 10, 1977 (P = 22.74, B_o = 3.39, L_o = 185.54)

LOCKHEED OSO-8 X-RAY



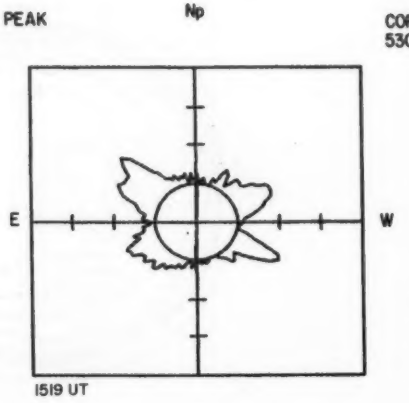
1-8Å FLUX (10^{-8} Wm^{-2})

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

SACRAMENTO PEAK

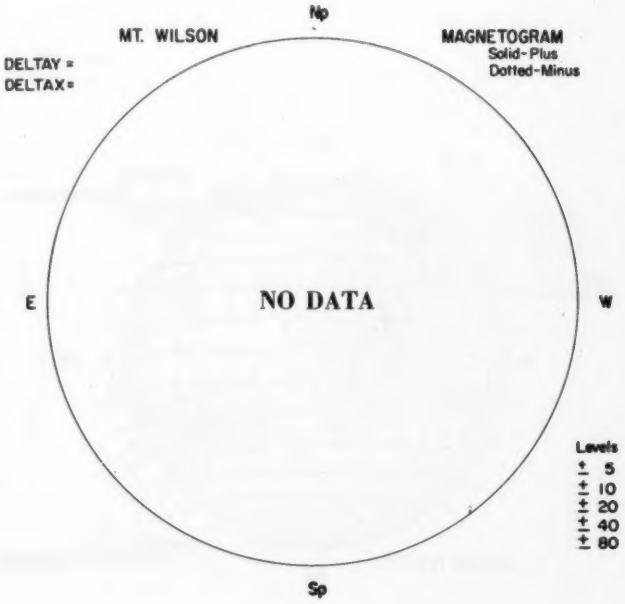
CORONA (1.15 $R_\odot$)
5303 Å



MT. WILSON

DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



Sp

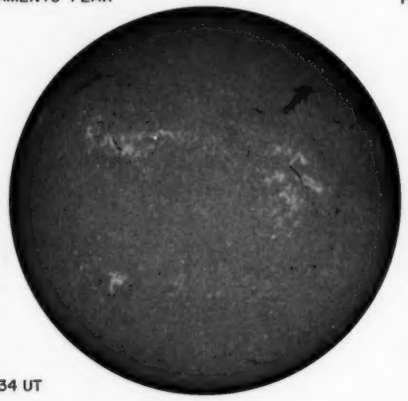
Sp

10

SACRAMENTO PEAK

Np

Hα



E

W

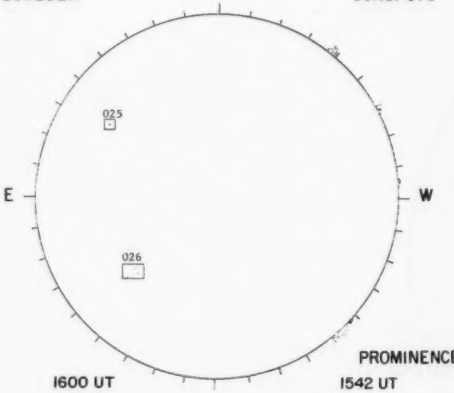
1534 UT

Sp

BOULDER

Np

SUNSPOTS



E

W

1600 UT

Sp

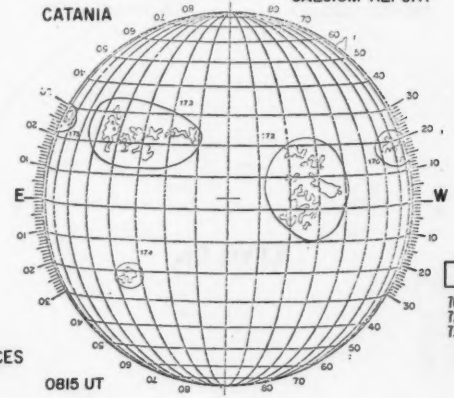
PROMINENCES

1542 UT

CATANIA

Np

CALCIUM REPORT



E

W

POOR EC

70 - 2676 - - -
72 - 5839 - - -
73 - 5155 - - -

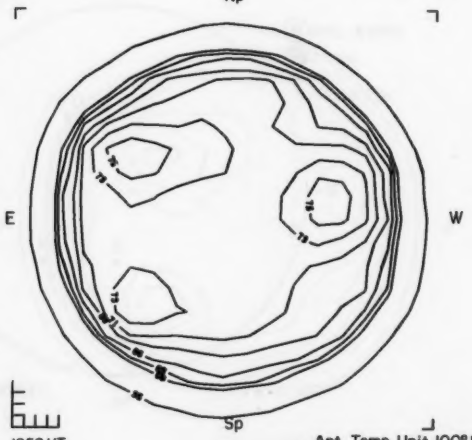
0815 UT

Sp

NOSC LA POSTA

2.0 CM

Np



E

W

Sp

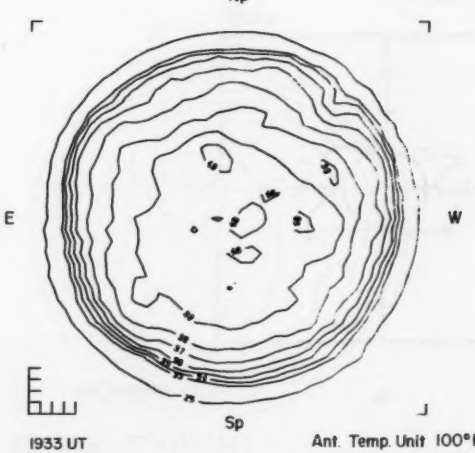
1858 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E

W

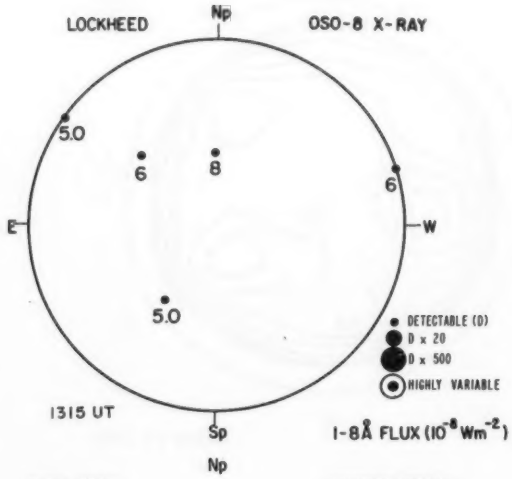
Sp

1933 UT

Ant. Temp. Unit 100°K

NOVEMBER 11, 1977 (P = 22.50, B_o = 3.28, L_o = 172.36)

LOCKHEED



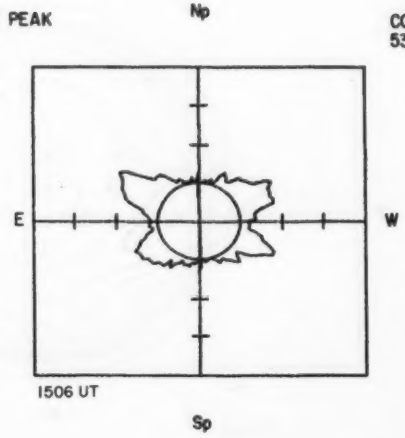
OSO-8 X-RAY

1-8Å FLUX (10^{-8} Wm^{-2})

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

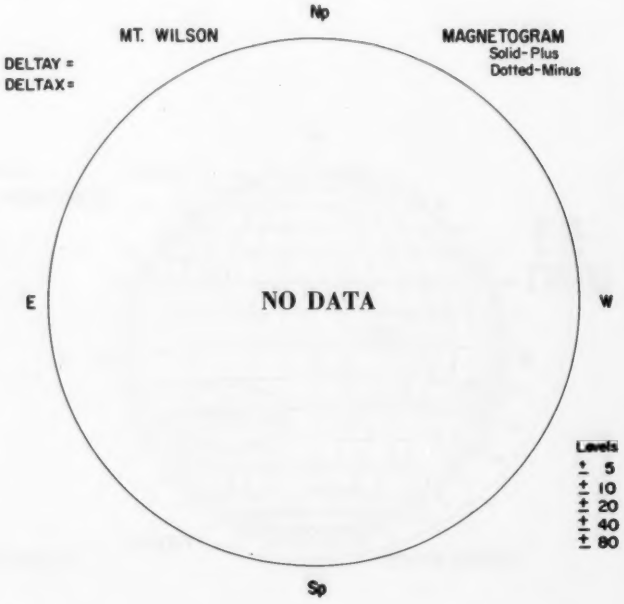
SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

MT. WILSON

DELTAY =
DELTAX =



MAGNETOGRAM
Solid - Plus
Dotted - Minus

Sp

Sp

SACRAMENTO PEAK

Np

Hα

E

W

1530 UT

Sp

BOULDER

Np

SUNSPOTS

028

025

026

E

W

1650 UT

Sp

PROMINENCES

1625 UT

McMATH-HULBERT

Np

CALCIUM REPORT

028

027

029

025

024

021

030

026

023

E

W

2100 UT

Sp

POOR	M
21 - 2500 - 25	
26 - 0900 - 30	
27 - 0500 - 30	
28 - 1400 - 30	

NOSC LA POSTA

2.0 CM

Np

E

W

Sp

1859 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np

E

W

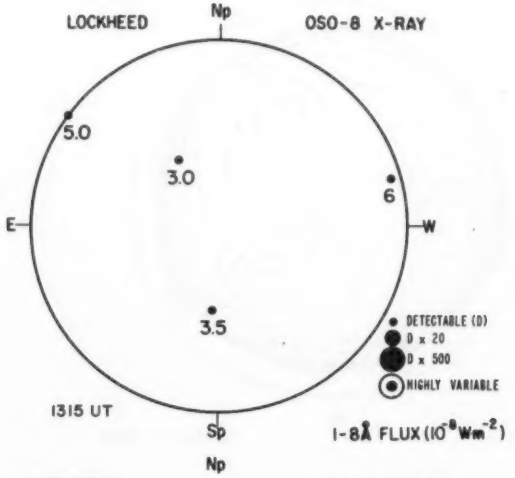
Sp

2016 UT

Ant. Temp. Unit 100°K

NOVEMBER 12, 1977 (P = 22.25, B_0 = 3.17, L_0 = 159.18)

LOCKHEED OSO-8 X-RAY

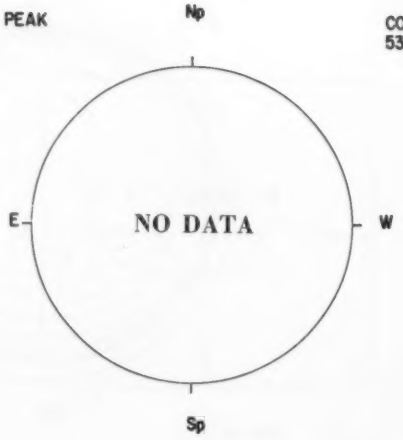


KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

SACRAMENTO PEAK

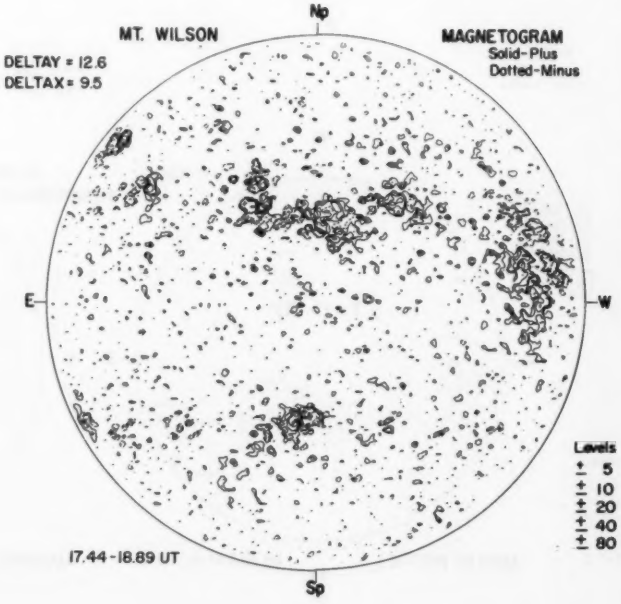
CORONA (1.15 $R_\odot$)
5303 Å



MT. WILSON

DELTAY = 12.6
DELTAX = 9.5

MAGNETOGRAM
Solid - Plus
Dotted - Minus



Sp

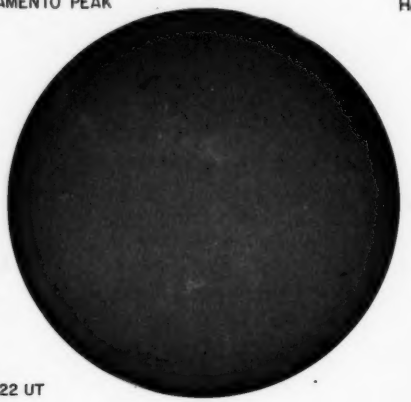
Sp

12

SACRAMENTO PEAK

Np

Hα



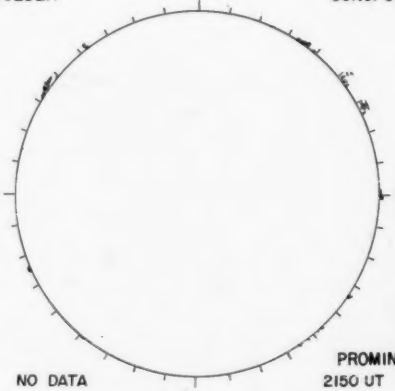
E W

1722 UT

Sp

BOULDER

Np



E W

NO DATA

Sp

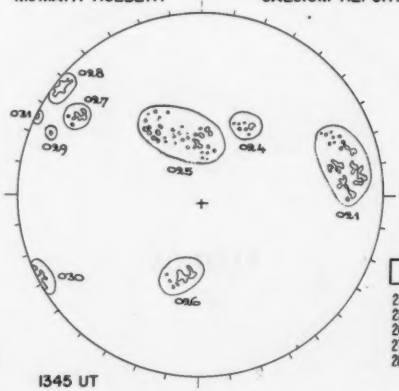
SUNSPOTS

PROMINENCES

2150 UT

McMATH-HULBERT

Np



E W

1345 UT

Sp

CALCIUM REPORT

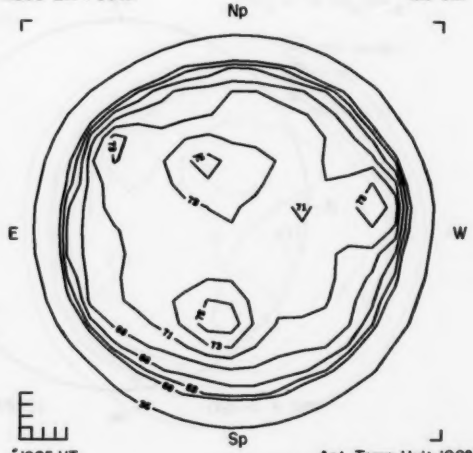
FAIR	M

21 - 2500 - 25
25 - 1200 - 25
26 - 0900 - 30
27 - 0500 - 30
28 - 2400 - 30

NOSC LA POSTA

2.0 CM

Np



E W

Sp

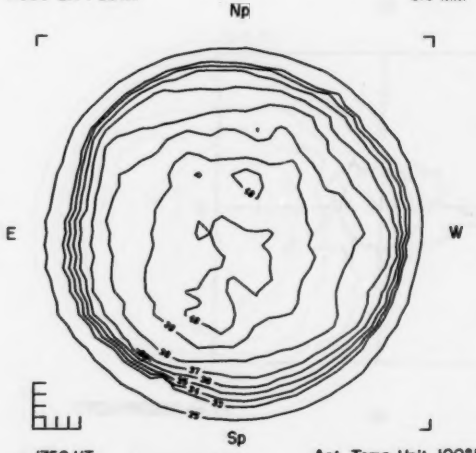
1905 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E W

Sp

1750 UT

Ant. Temp. Unit 100°K

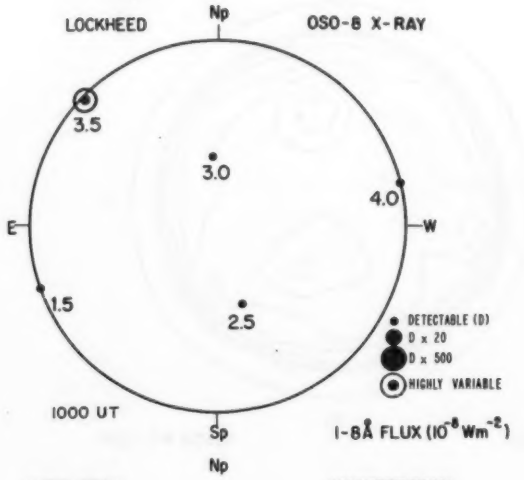
59

Nov 77

NOVEMBER 13, 1977 (P = 22.00, B_o = 3.05, L_o = 145.99)

Nov 77

LOCKHEED



OSO-8 X-RAY

DETECTABLE (D)
D x 20
D x 500
HIGHLY VARIABLE

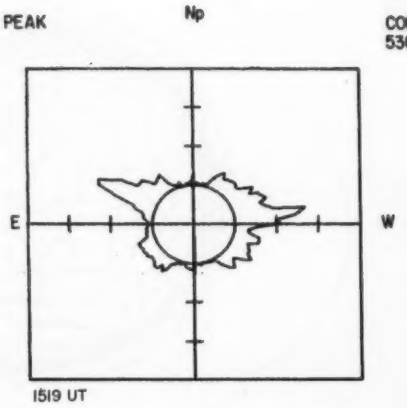
1000 UT

1-8Å FLUX (10^{-8} Wm^{-2})

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

SACRAMENTO PEAK

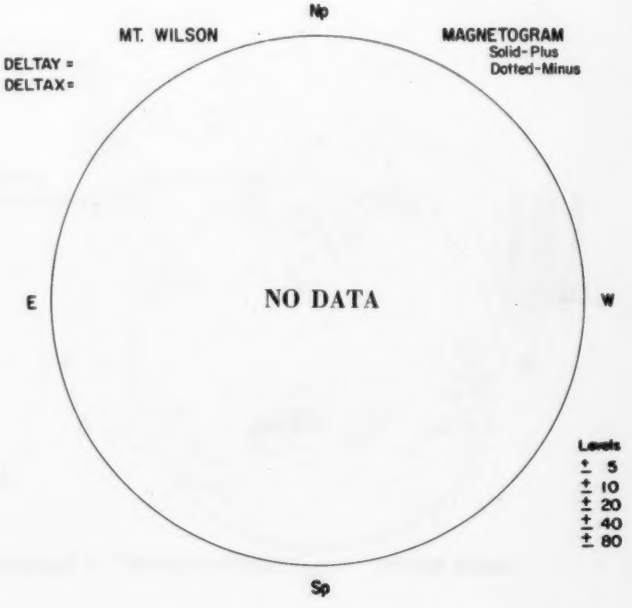


CORONA (1.15 $R_\odot$)
5303 Å

1519 UT

MT. WILSON

DELTAY =
DELTAX =



MAGNETOGRAM
Solid - Plus
Dotted - Minus

Levels
± 5
± 10
± 20
± 40
± 80

Sp

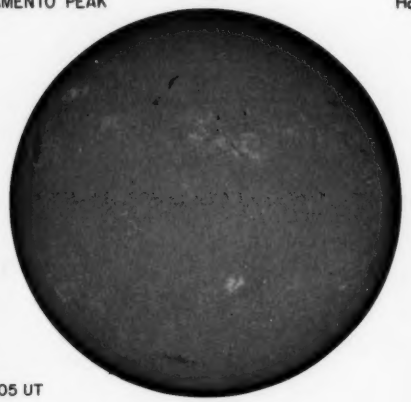
Sp

13

SACRAMENTO PEAK

Np

Hα



E

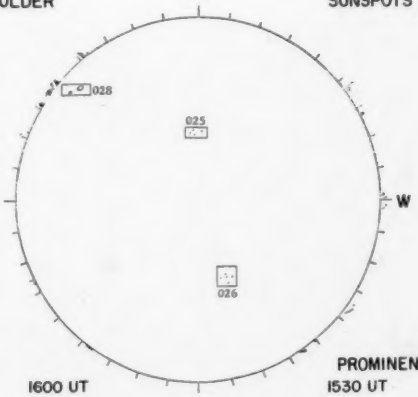
W

1605 UT

Sp

BOULDER

Np



E

W

1600 UT

Sp

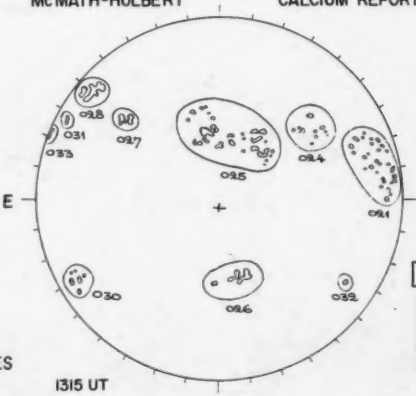
SUNSPOTS

PROMINENCES

1530 UT

McMATH-HULBERT

Np



E

W

1315 UT

Sp

CALCIUM REPORT

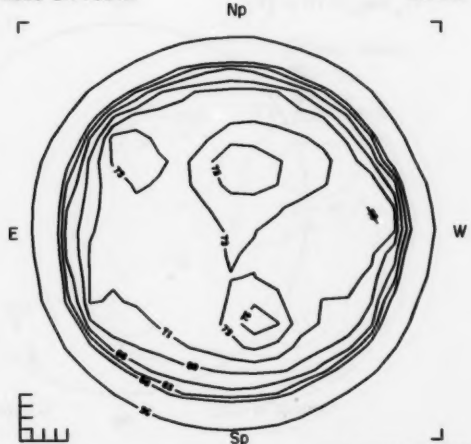
FAIR	D

25 - 1800 - 25
26 - 0900 - 30
27 - 0500 - 25
28 - 2200 - 30
30 - 0700 - 25

NOSC LA POSTA

2.0 CM

Np



E

W

Sp

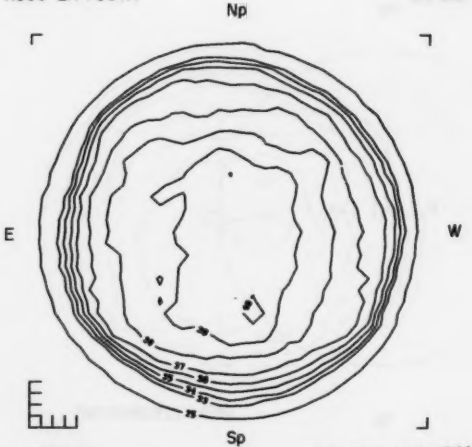
1825 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E

W

Sp

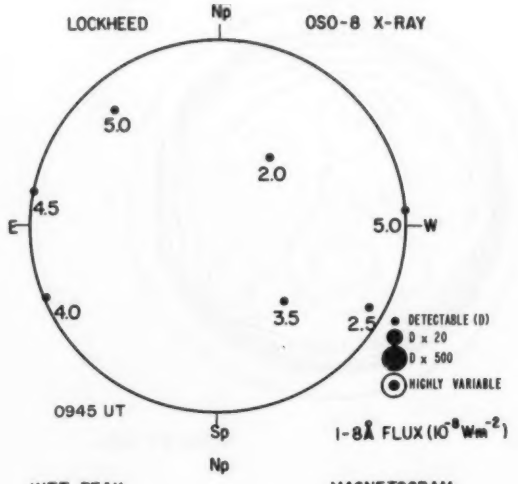
1727 UT

Ant. Temp. Unit 100°K

61
Nov 77

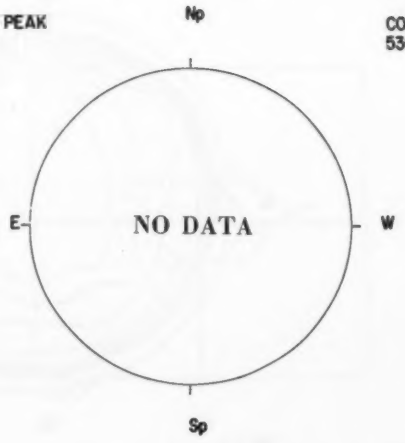
NOVEMBER 14, 1977 (P = 21.73, B_o = 2.94, L_o = 132.81)

LOCKHEED OSO-8 X-RAY



SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



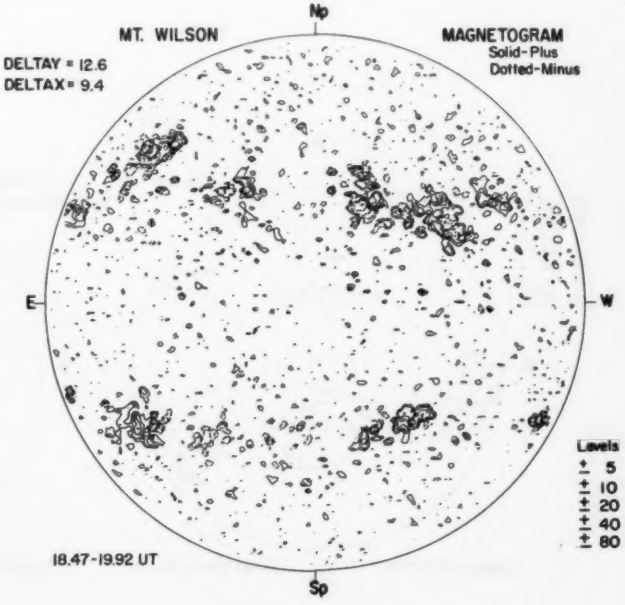
KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

MT. WILSON

MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.6
DELTAX = 9.4



18.47-19.92 UT

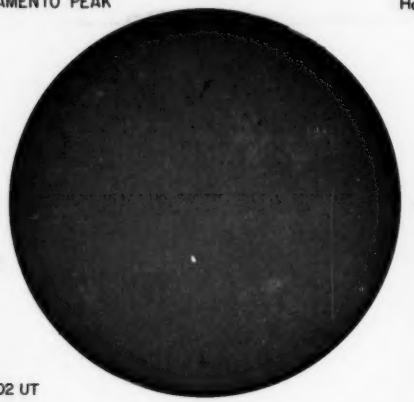
Sp

Sp

14

SACRAMENTO PEAK Np

Hα

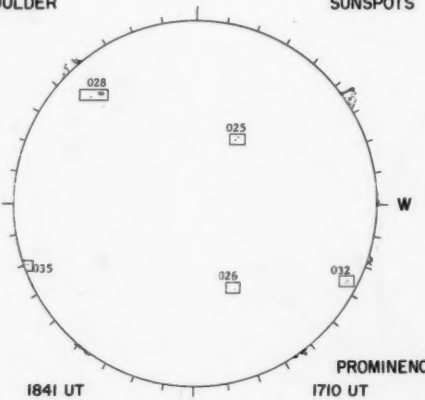


E W

1902 UT

Sp

BOULDER Np



E W

1841 UT

Sp

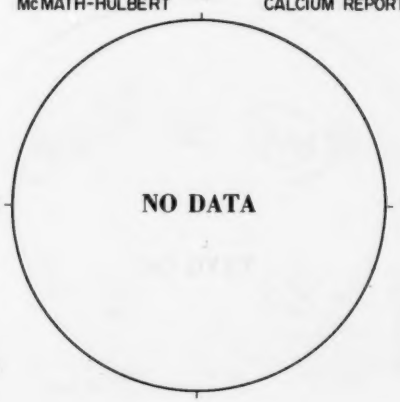
SUNSPOTS

PROMINENCES

1710 UT

McMATH-HULBERT Np

CALCIUM REPORT



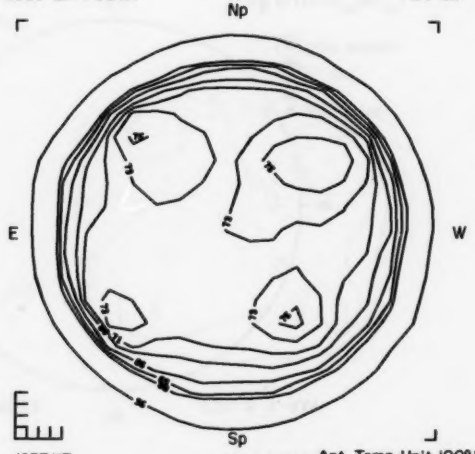
E W

Sp

NOSC LA POSTA

2.0 CM

Np



E W

1937 UT

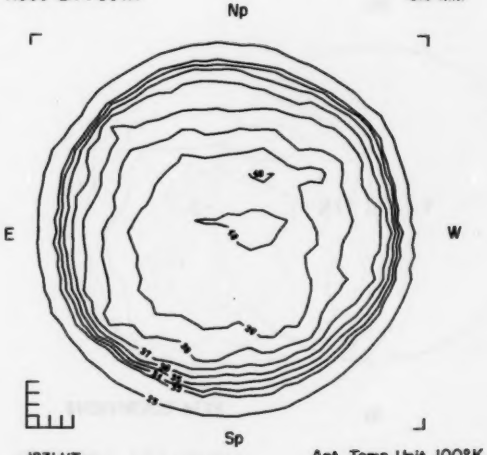
Sp

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E W

1831 UT

Sp

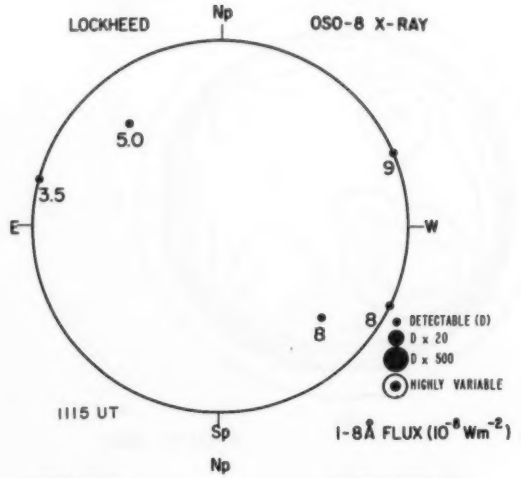
Ant. Temp. Unit 100°K

63

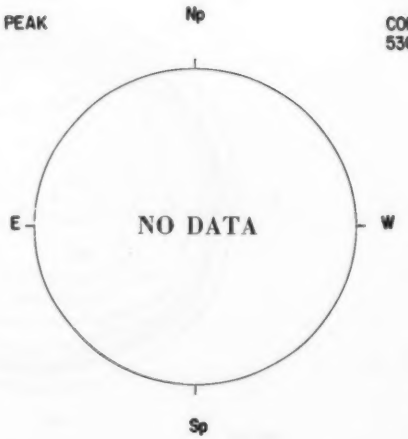
Nov 77

NOVEMBER 15, 1977 (P = 21.46, B_o = 2.82, L_o = 119.63)

LOCKHEED OSO-8 X-RAY

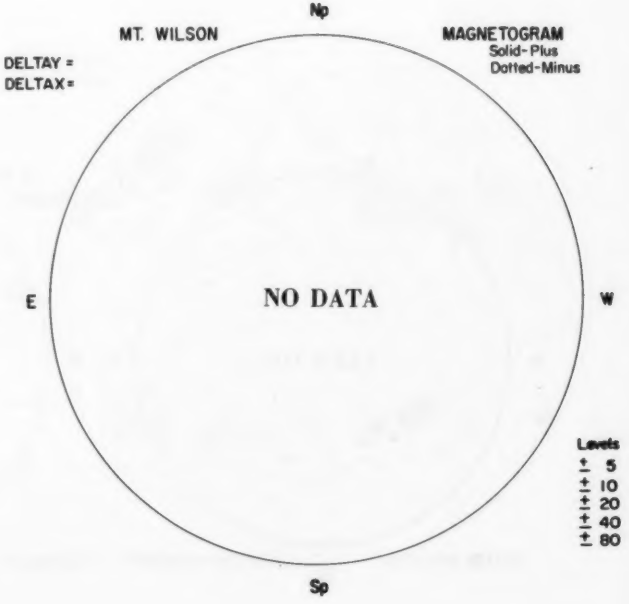


SACRAMENTO PEAK



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX =



Sp

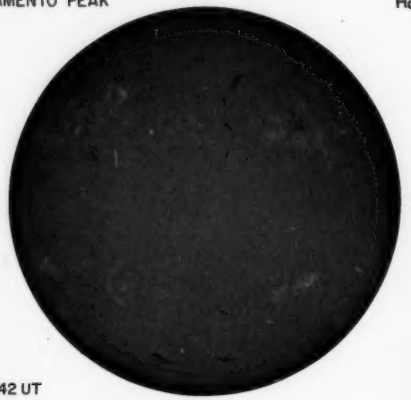
Sp

15

SACRAMENTO PEAK

Np

Hα



E

W

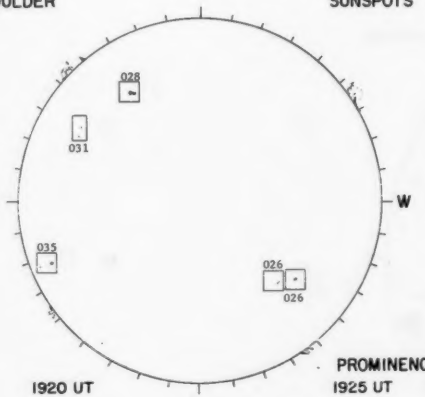
1642 UT

Sp

BOULDER

Np

SUNSPOTS



E

W

1920 UT

Sp

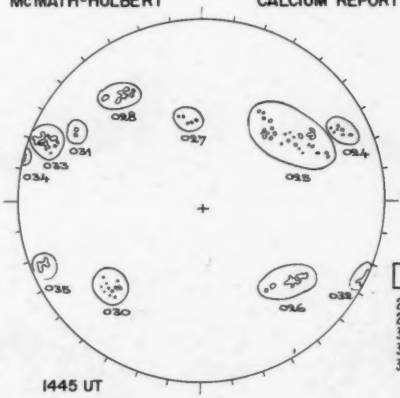
PROMINENCES

1925 UT

McMATH-HULBERT

Np

CALCIUM REPORT



E

W

POOR	S
26 - 1100	- 30
28 - 1700	- 30
32 - 1800	- 25
34 - 0600	- 25
35 - 1200	- 25

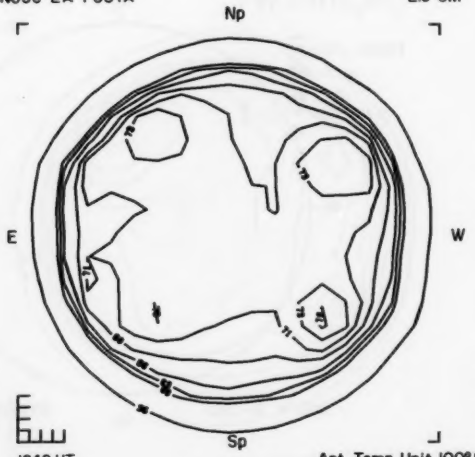
1445 UT

Sp

NOSC LA POSTA

2.0 CM

Np



E

W

1848 UT

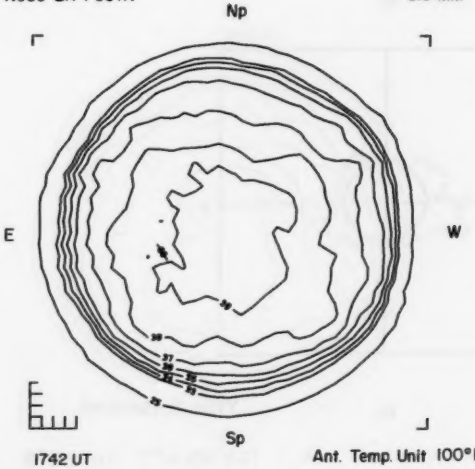
Sp

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E

W

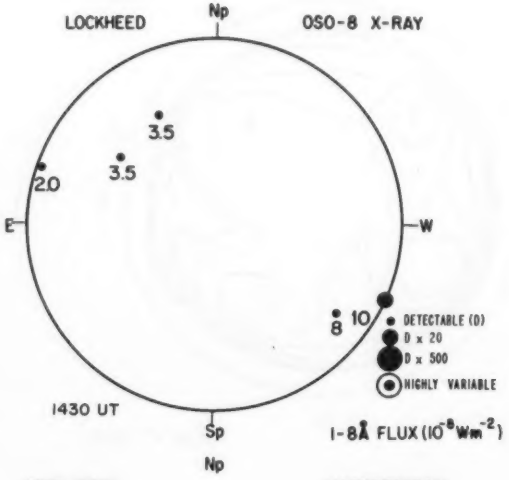
1742 UT

Sp

Ant. Temp. Unit 100°K

NOVEMBER 16, 1977 (P = 21.18, B_o = 2.70, L_o = 106.45)

LOCKHEED



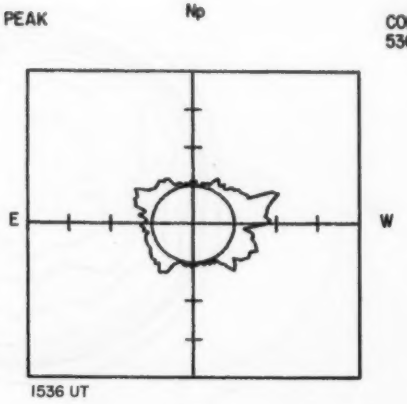
OSO-8 X-RAY

I-8Å FLUX (10^{-8} Wm^{-2})

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

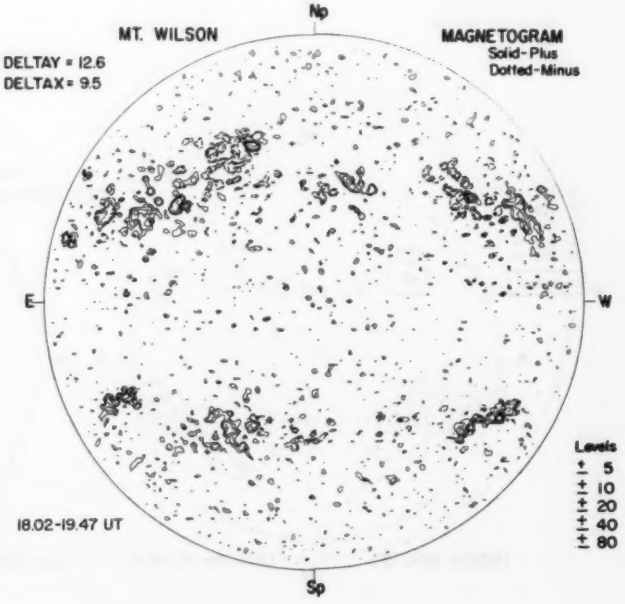
SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

MT. WILSON

DELTAY = 12.6
DELTAX = 9.5



MAGNETOGRAM
Solid - Plus
Dotted - Minus

Sp

Sp

16

SACRAMENTO PEAK

Np

Hα

E

W

1513 UT

Sp

BOULDER

Np

SUNSPOTS

028

031

025

035

026

026

E

W

1705 UT

Sp

PROMINENCES

1640 UT

McMATH-HULBERT

Np

CALCIUM REPORT

036

033

034

031

028

027

025

035

030

046

E

W

1810 UT

Sp

FAIR	M
25 - 0800 - 25	
26 - 1400 - 35	
28 - 1400 - 30	
31 - 0600 - 30	
33 - 1000 - 25	
34 - 0600 - 30	
35 - 0900 - 30	

NOSC LA POSTA

2.0 CM

Np

E

W

Sp

1938 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np

E

W

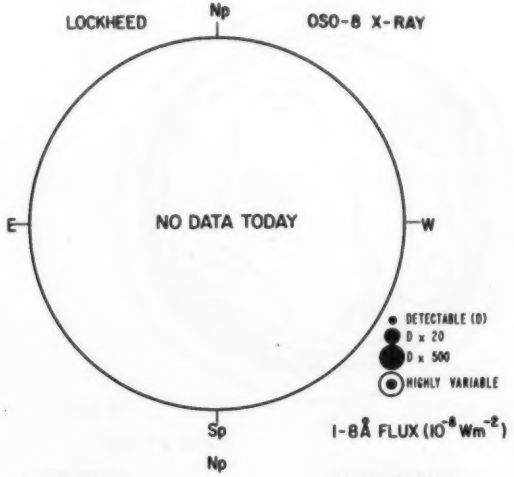
Sp

1840 UT

Ant. Temp. Unit 100°K

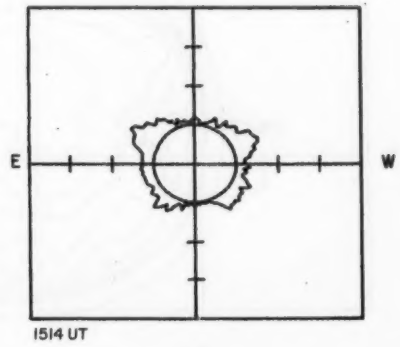
NOVEMBER 17, 1977 (P = 20.90, B_o = 2.58, L_o = 93.26)

LOCKHEED — OSO-8 X-RAY



1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å

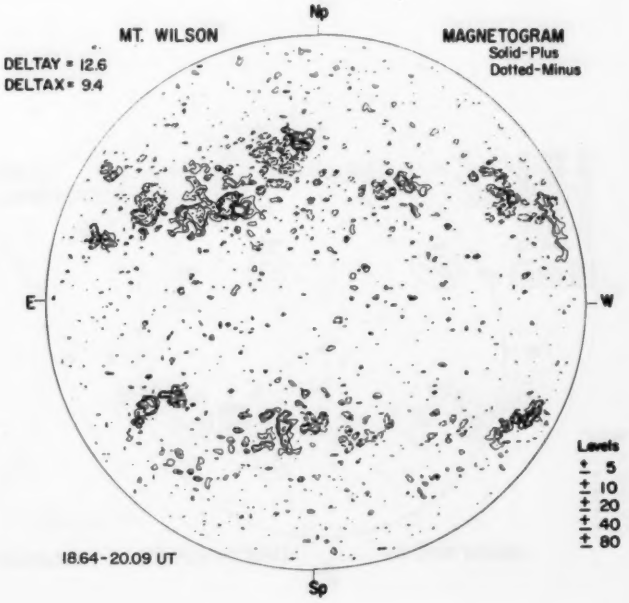


1514 UT

KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus

MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.6
DELTAX = 9.4



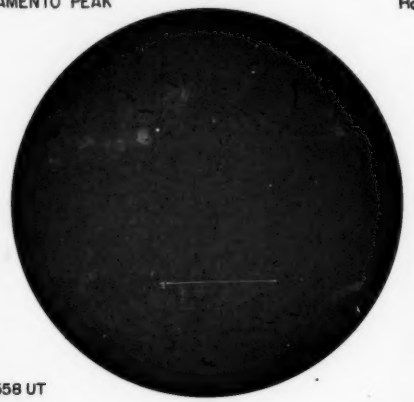
18.64 - 20.09 UT

Sp

Sp

17

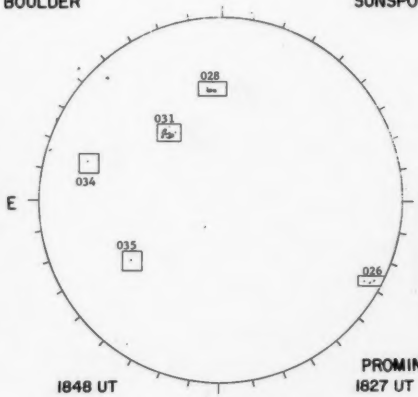
SACRAMENTO PEAK Np Hα



1558 UT

Sp

BOULDER Np



1848 UT

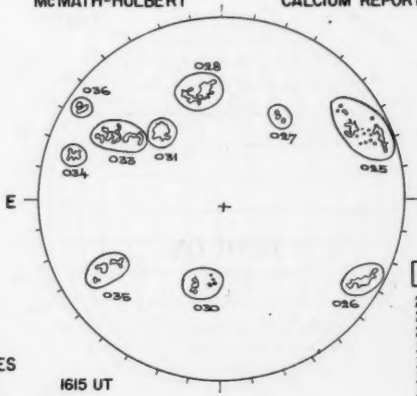
Sp

SUNSPOTS

PROMINENCES

1827 UT

McMATH-HULBERT Np



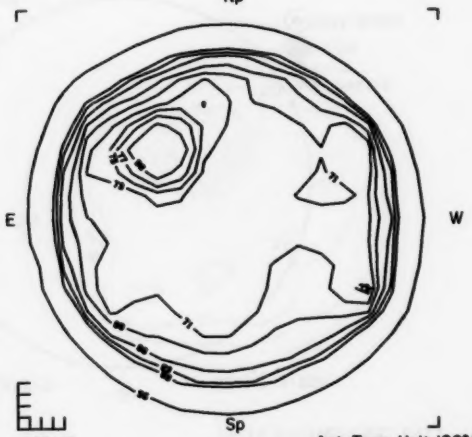
1615 UT

Sp

CALCIUM REPORT

GOOD	M
25 - 0800 - 25	
26 - 1700 - 35	
28 - 1400 - 30	
31 - 1200 - 35	
33 - 0900 - 25	
34 - 0700 - 30	
35 - 0900 - 25	

NOSC LA POSTA 2.0 CM Np

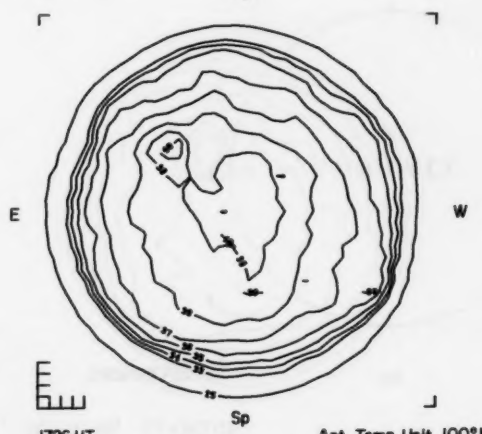


1827 UT

Sp

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM Np



1726 UT

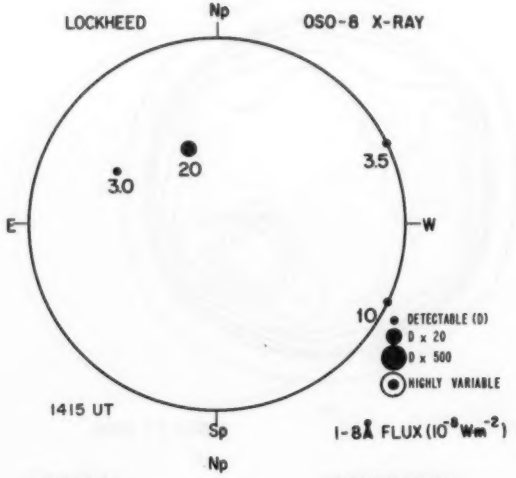
Sp

Ant. Temp. Unit 100°K

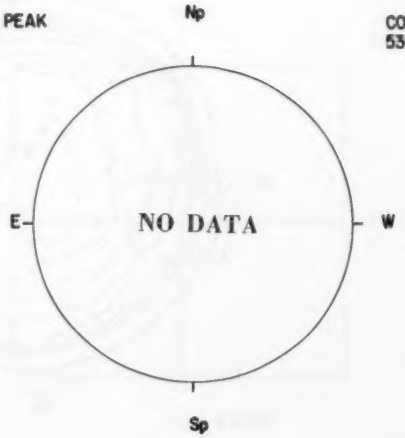
69
Nov 77

NOVEMBER 18, 1977 (P = 20.61, B_o = 2.46, L_o = 80.08)

LOCKHEED — OSO-8 X-RAY



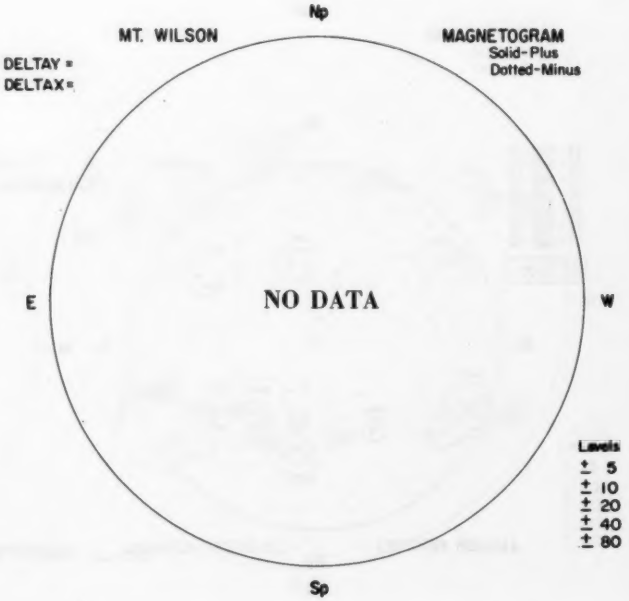
SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å



KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus

MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

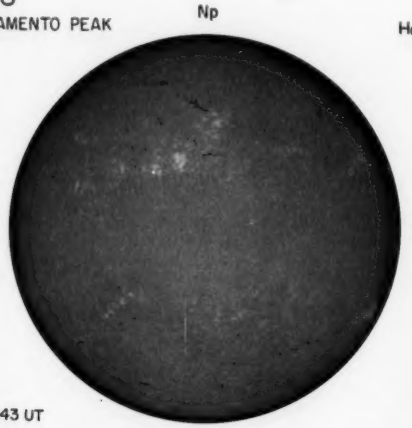


Sp

Sp

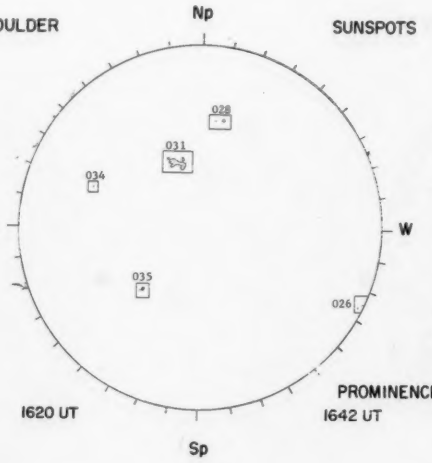
18

SACRAMENTO PEAK



1543 UT

Hα BOULDER



1620 UT

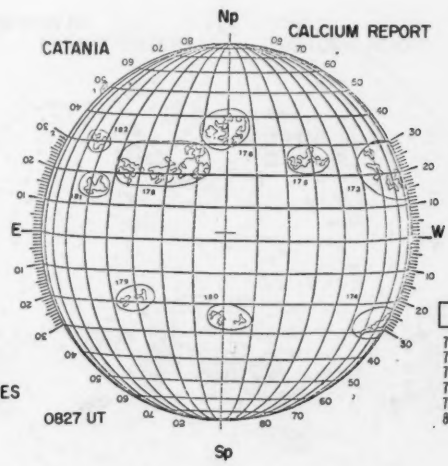
SUNSPOTS

PROMINENCES

1642 UT

CATANIA

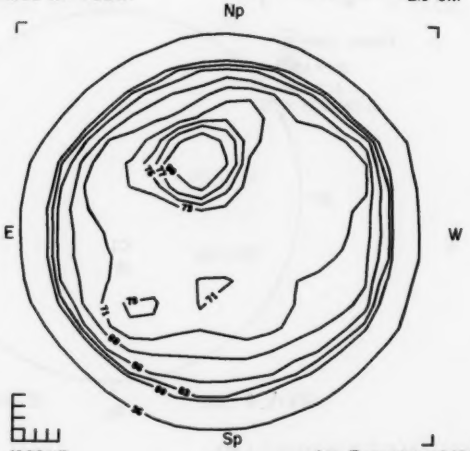
CALCIUM REPORT



0827 UT

	FAIR	GD
74 - 1961	---	
73 - 2982	---	
76 - 2853	---	
78 - 4563	---	
79 - 0598	---	
81 - 1298	---	

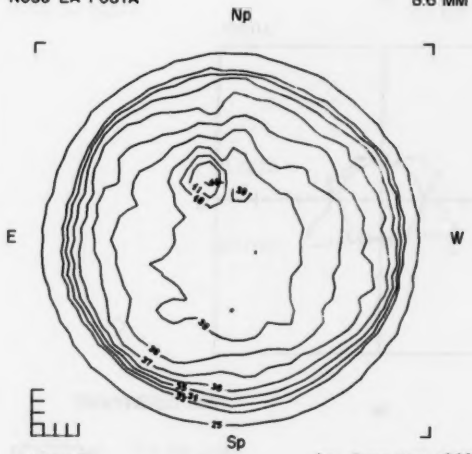
NOSC LA POSTA 2.0 CM



1908 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



1747 UT

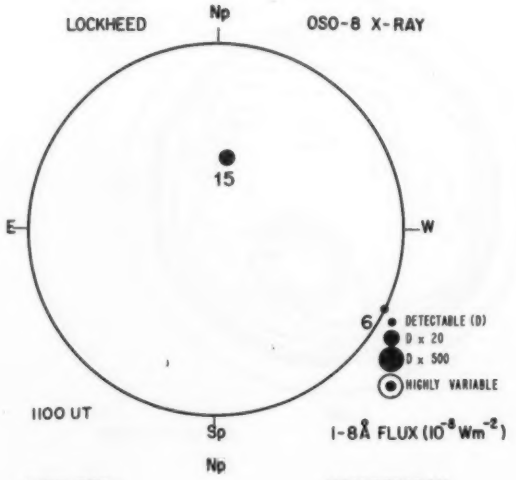
Ant. Temp. Unit 100°K

71
Nov 77

NOVEMBER 19, 1977 (P = 20.30, B_o = 2.34, L_o = 66.90)

LOCKHEED

OSO-8 X-RAY



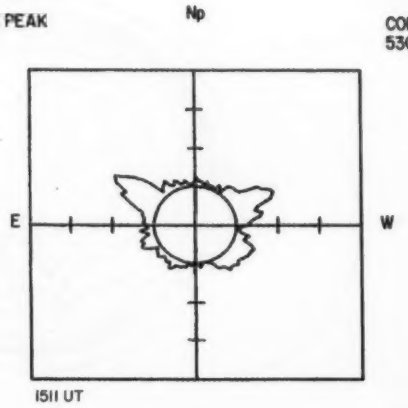
1-8Å FLUX (10^{-3} Wm^{-2})

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

SACRAMENTO PEAK

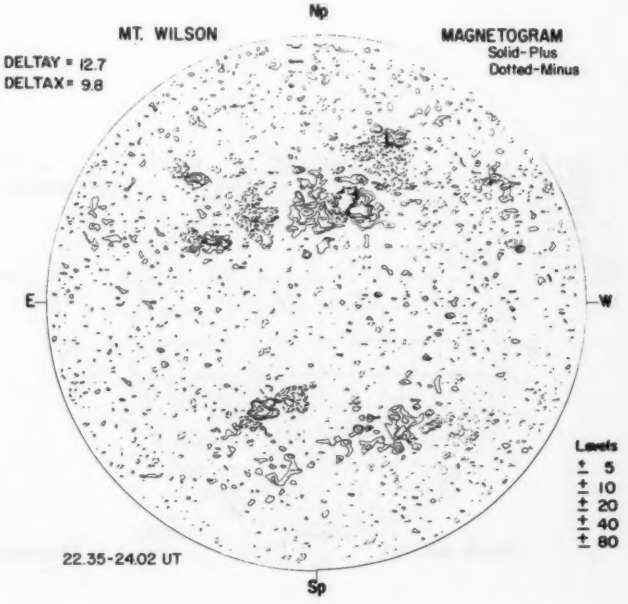
CORONA (1.15 $R_\odot$)
5303 Å



MT. WILSON

MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.7
DELTAX = 9.8



Sp

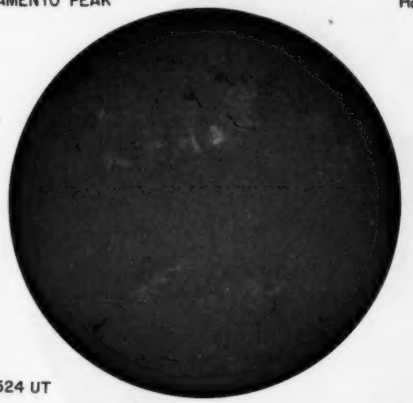
Sp

19

SACRAMENTO PEAK

Np

Hα



E

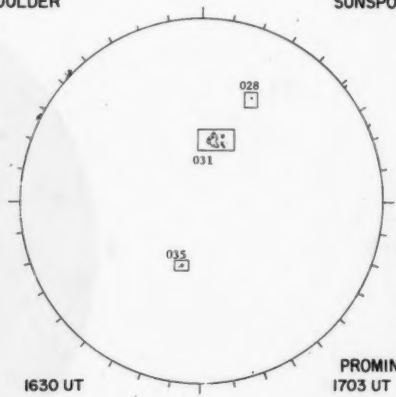
W

1524 UT

Sp

BOULDER

Np



E

W

1630 UT

Sp

SUNSPOTS

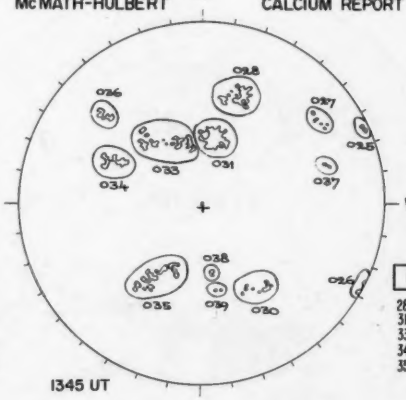
PROMINENCES

1703 UT

McMATH-HULBERT

Np

CALCIUM REPORT



E

W

1345 UT

Sp

FAIR	M

28 - 1500 - 25
31 - 1800 - 35
33 - 1200 - 25
34 - 0800 - 25
35 - 1200 - 25

NOSC LA POSTA

Np

2.0 CM

NO DATA

E

WEATHER

W

----UT

Sp

Ant. Temp. Unit 100°K

NOSC LA POSTA

Np

8.6 MM

NO DATA

E

WEATHER

W

----UT

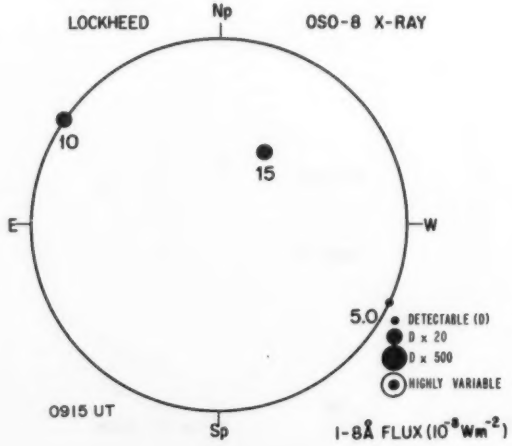
Sp

Ant. Temp. Unit 100°K

73
Nov 77

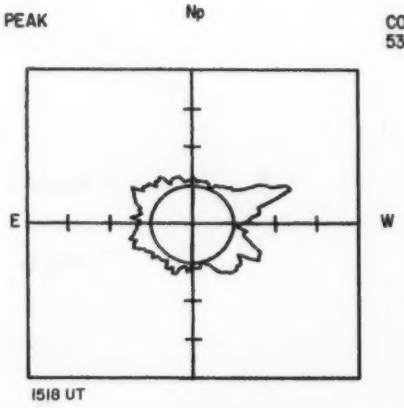
NOVEMBER 20, 1977 (P = 20.00, B_o = 2.22, L_o = 53.72)

LOCKHEED OSO-8 X-RAY

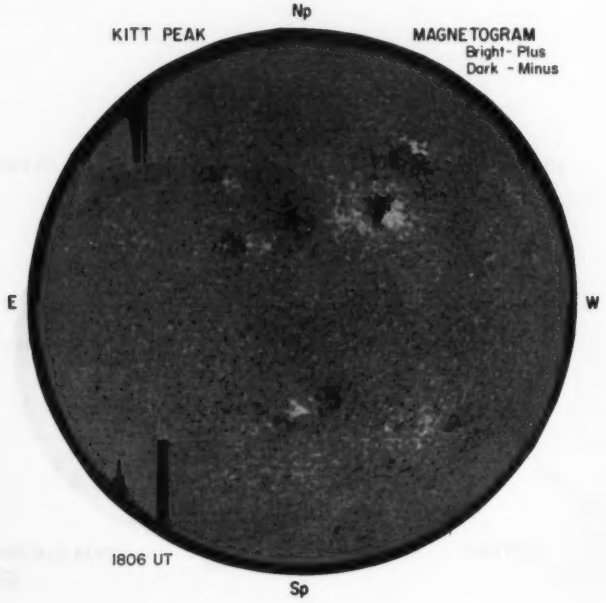


1-8Å FLUX (10^{-8} Wm^{-2})

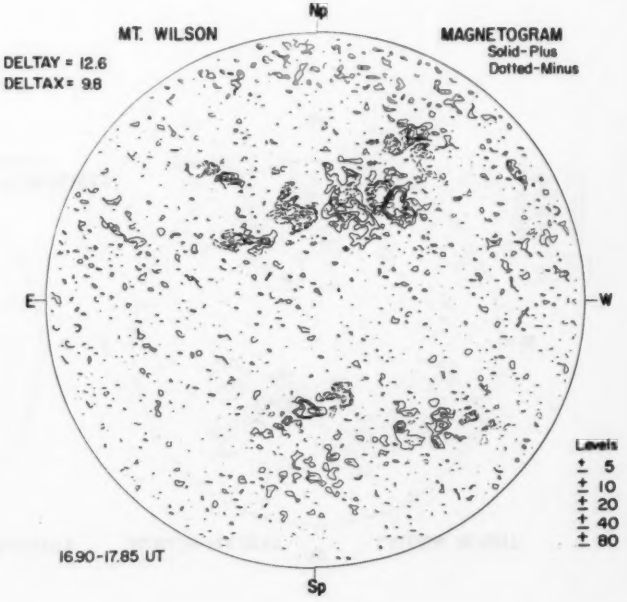
SACRAMENTO PEAK



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.8



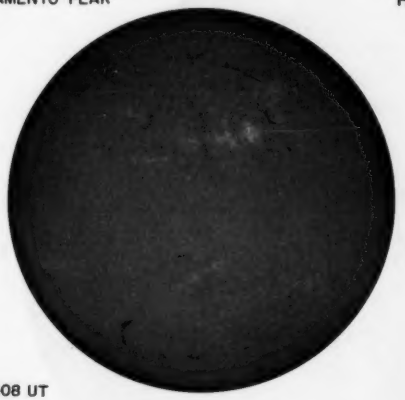
Sp

Sp

20

SACRAMENTO PEAK

Np



E

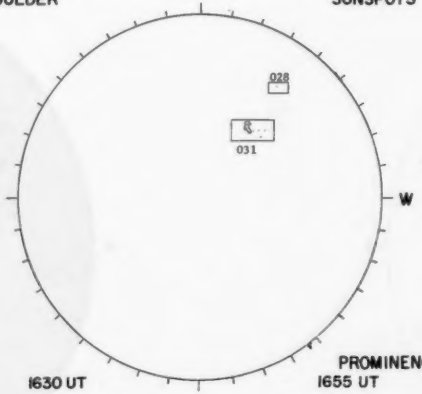
W

1508 UT

Sp

Hα BOULDER

Np



E

W

1630 UT

Sp

SUNSPOTS

PROMINENCES

1655 UT

McMATH-HULBERT

Np

NO DATA

E

W

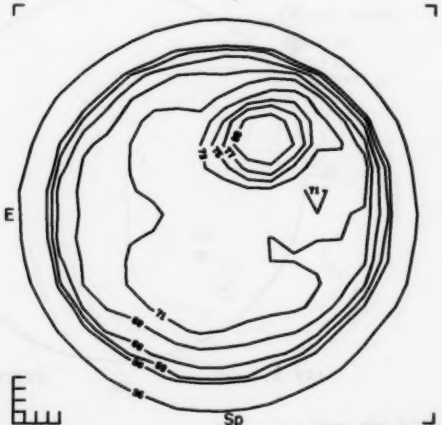
Sp

CALCIUM REPORT

NOSC LA POSTA

2.0 CM

Np



E

W

Sp

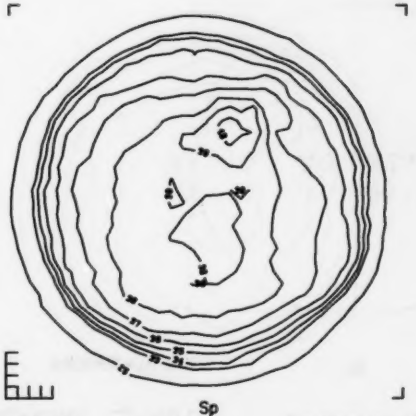
1833 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E

W

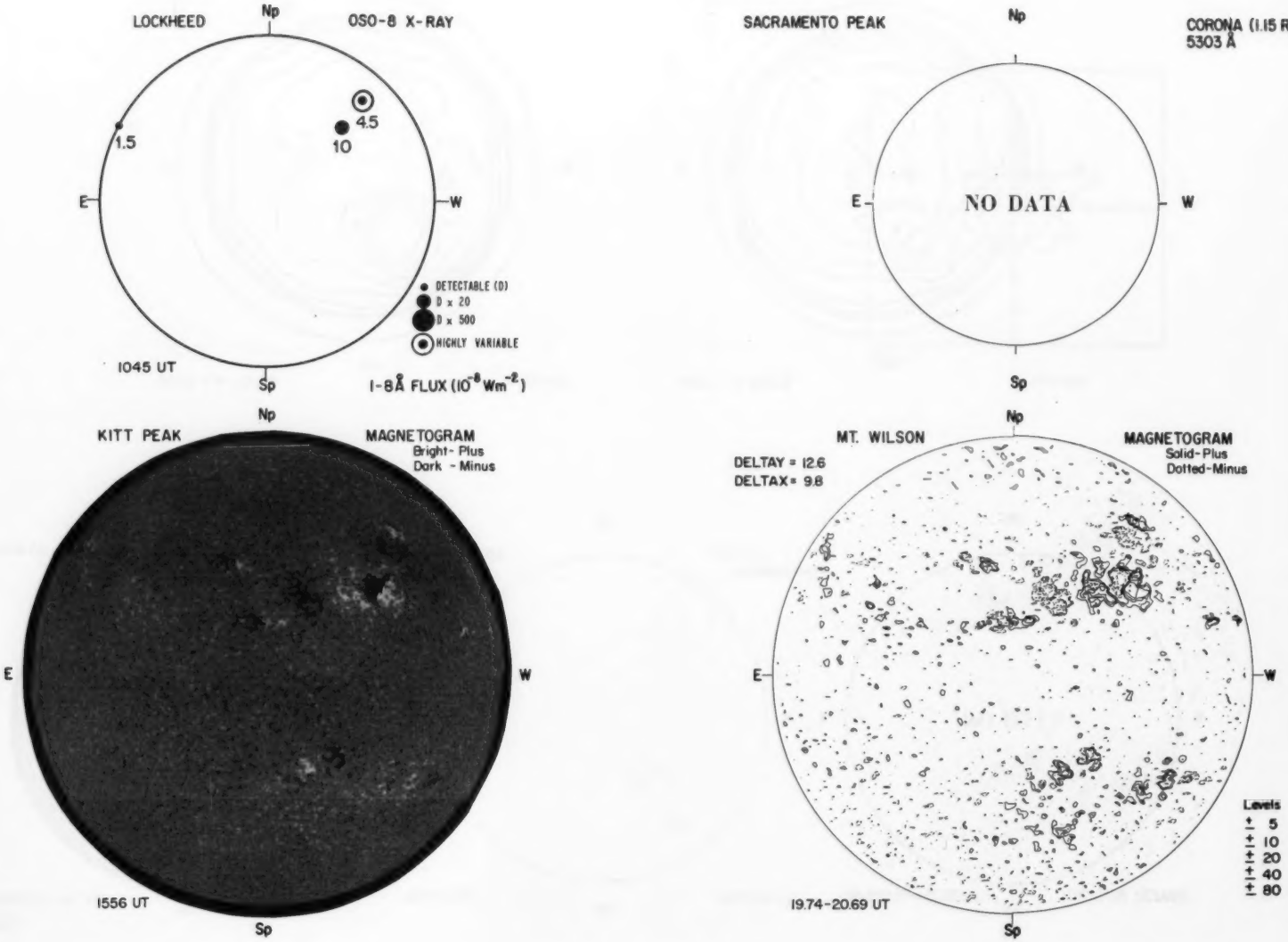
Sp

1737 UT

Ant. Temp. Unit 100°K

75
Nov 77

NOVEMBER 21, 1977 (P = 19.68, B_0 = 2.10, L_0 = 40.54)



Sp

Sp

21

SACRAMENTO PEAK

Np

Hα

E

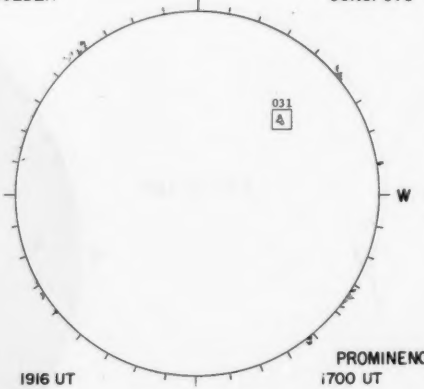
W

1427 UT

Sp

BOULDER

Np



E

W

1916 UT

Sp

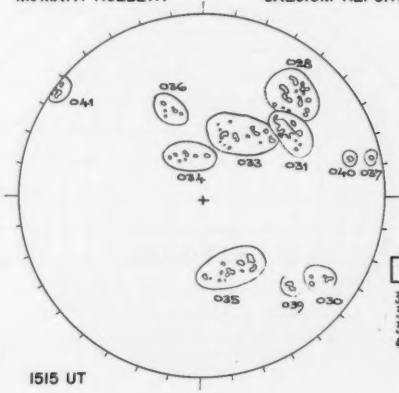
SUNSPOTS

PROMINENCES

1700 UT

McMATH-HULBERT

Np



E

W

1515 UT

Sp

CALCIUM REPORT

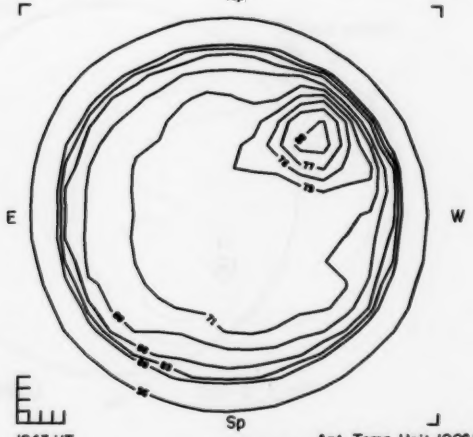
POOR	D

31-1500 -30
33-1200 -25
35-1100 -25
40-0200 -25

NOSC LA POSTA

2.0 CM

Np



E

W

1843 UT

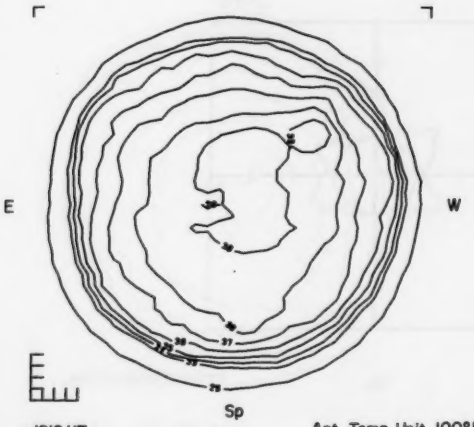
Sp

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np



E

W

1918 UT

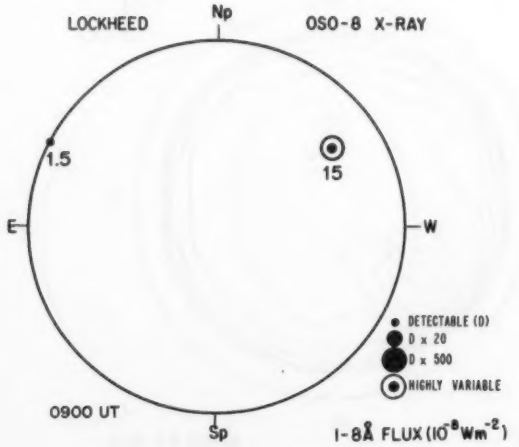
Sp

Ant. Temp. Unit 100°K

77
Nov 77

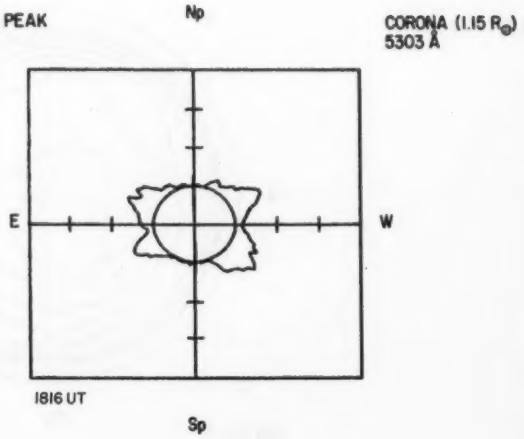
NOVEMBER 22, 1977 (P = 19.36, B_o = 1.98, L_o = 27.35)

LOCKHEED OSO-8 X-RAY

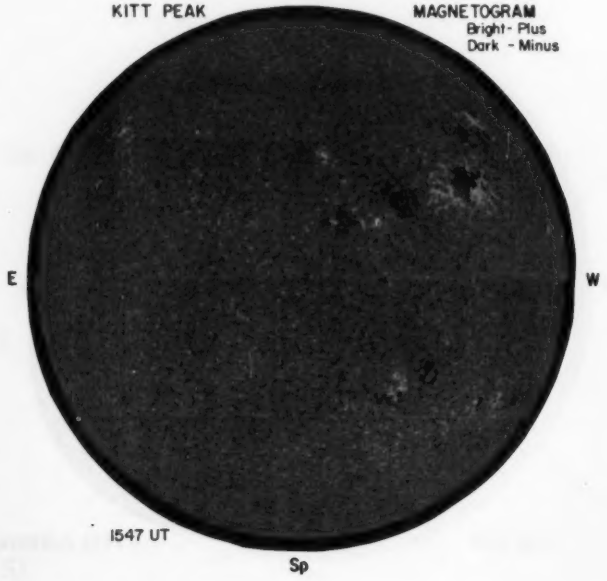


1-8Å FLUX (10^{-8} Wm^{-2})

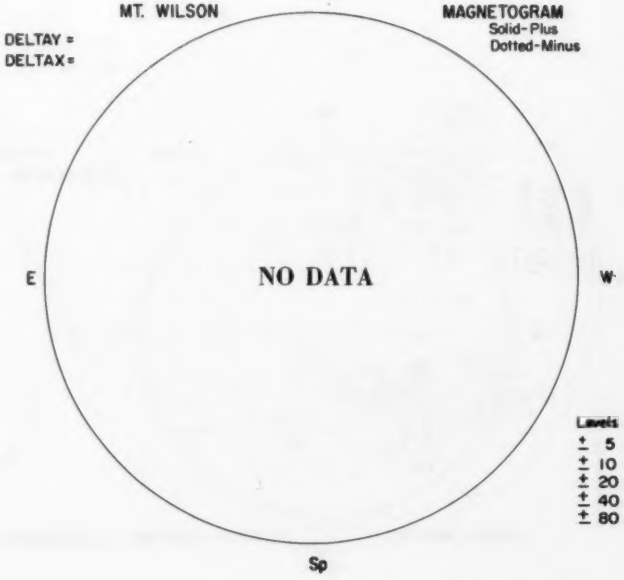
SACRAMENTO PEAK



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX =

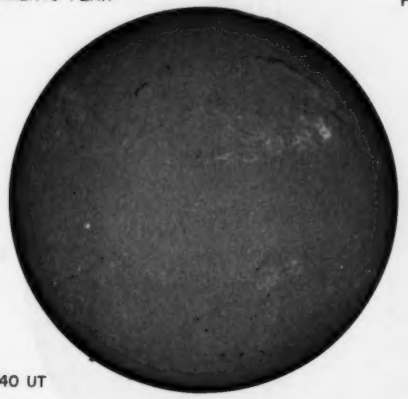


Levels
± 5
± 10
± 20
± 40
± 80

22

SACRAMENTO PEAK

Np



E W

Sp

1640 UT

Hα BOULDER

Np

E W

NO DATA

Sp

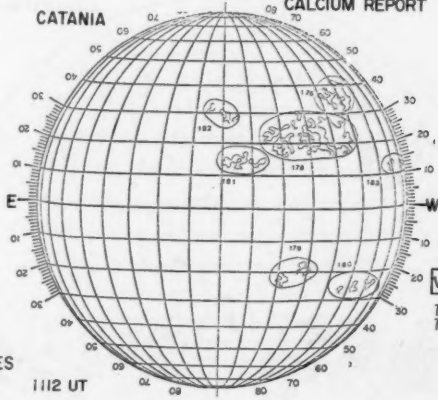
SUNSPOTS

PROMINENCES

CATANIA

Np

CALCIUM REPORT



E W

Sp

1112 UT

V POOR GD

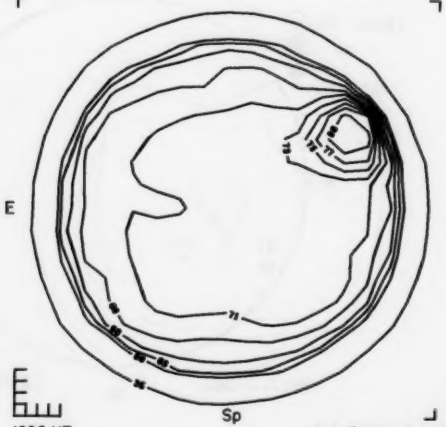
78 - 6248 - - -

79 - 0707 - - -

NOSC LA POSTA

2.0 CM

Np



E W

Sp

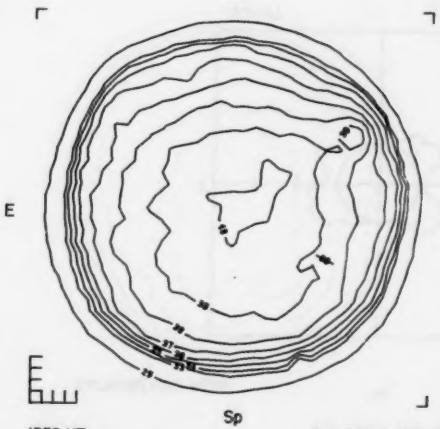
1822 UT

Ant Temp. Unit 100° K

NOSC LA POSTA

8.6 MM

Np



E W

Sp

1858 UT

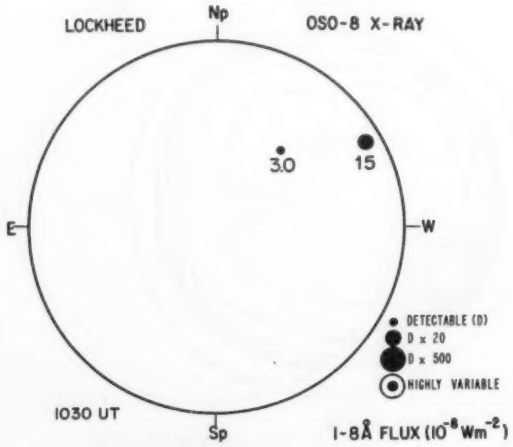
Ant. Temp. Unit 100° K

Nov 77

79

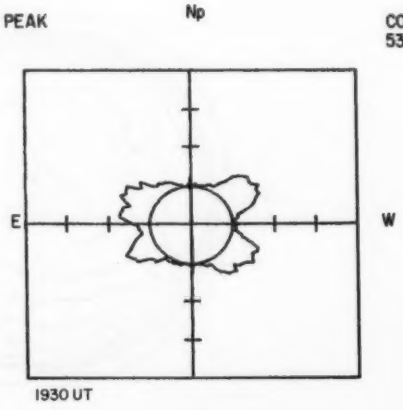
NOVEMBER 23, 1977 (P = 19.03, B_o = 1.86, L_o = 14.17)

LOCKHEED OSO-8 X-RAY

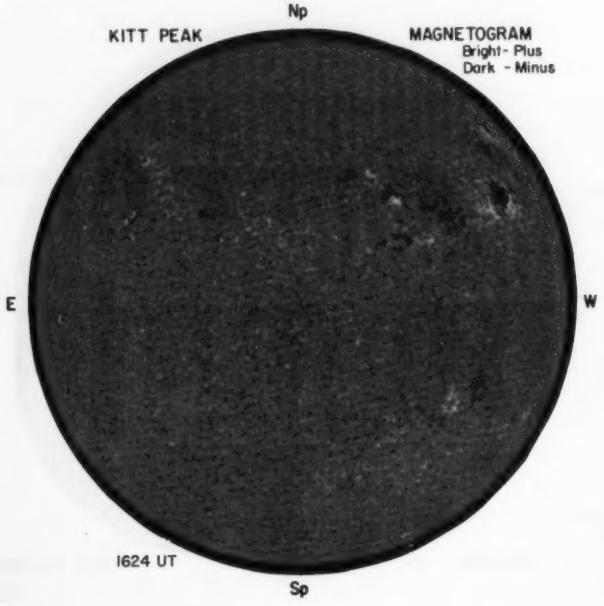


1-8Å FLUX (10^{-8} Wm^{-2})

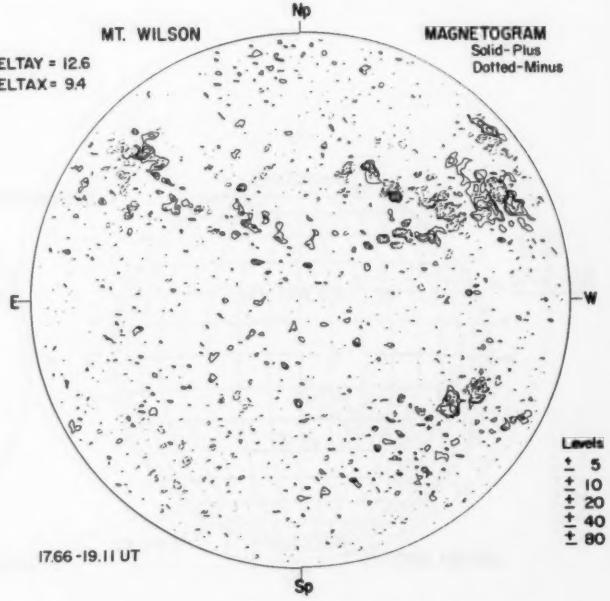
SACRAMENTO PEAK



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

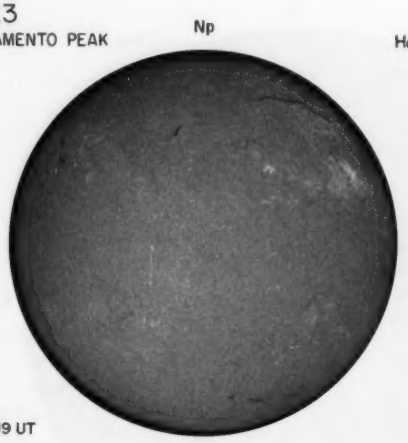


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.4



23

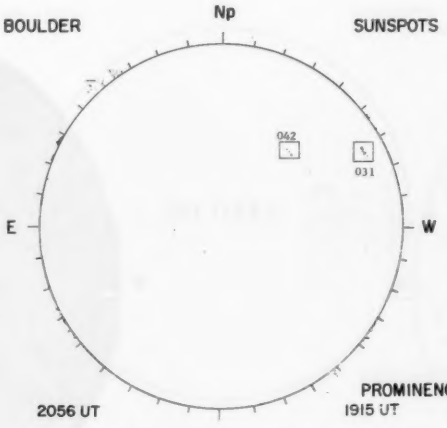
SACRAMENTO PEAK



1819 UT

Hα

BOULDER



2056 UT

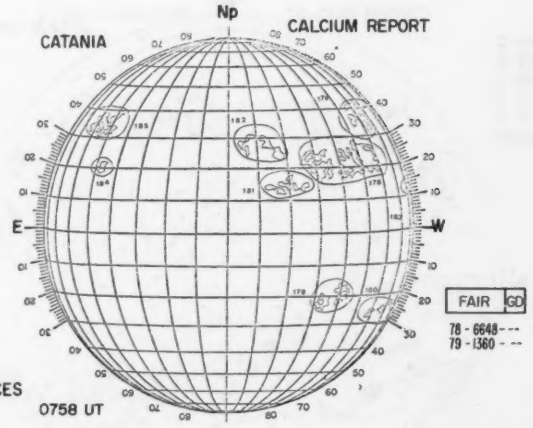
SUNSPOTS

PROMINENCES

1915 UT

CATANIA

CALCIUM REPORT



0758 UT

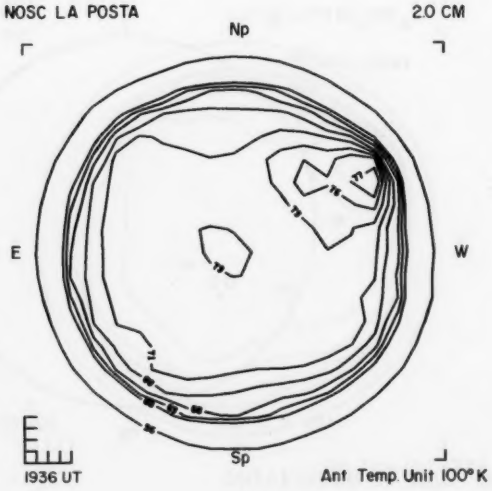
FAIR GD

78 - 6648 - - -

79 - 1360 - - -

NOSC LA POSTA

2.0 CM

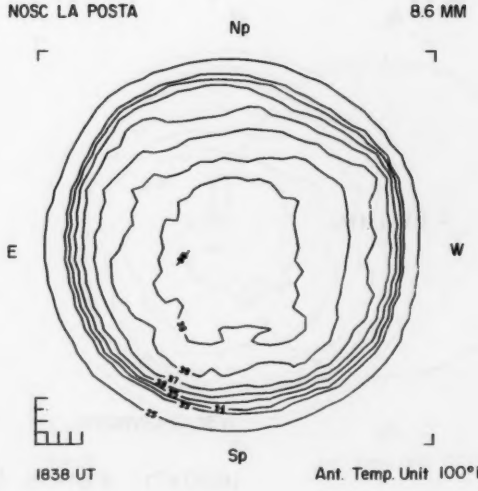


1936 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

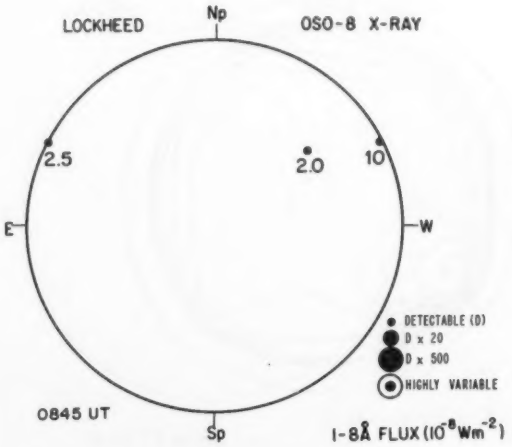


1838 UT

Ant. Temp. Unit 100°K

NOVEMBER 24, 1977 (P = 18.69, B_o = 1.73, L_o = 0.99)

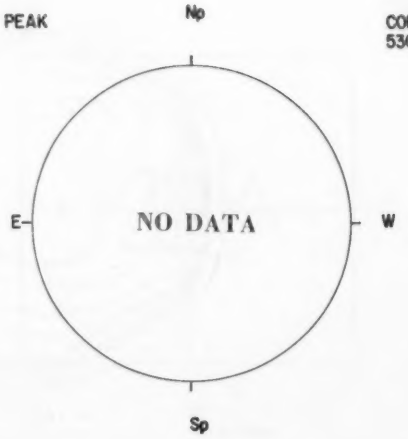
LOCKHEED OSO-8 X-RAY



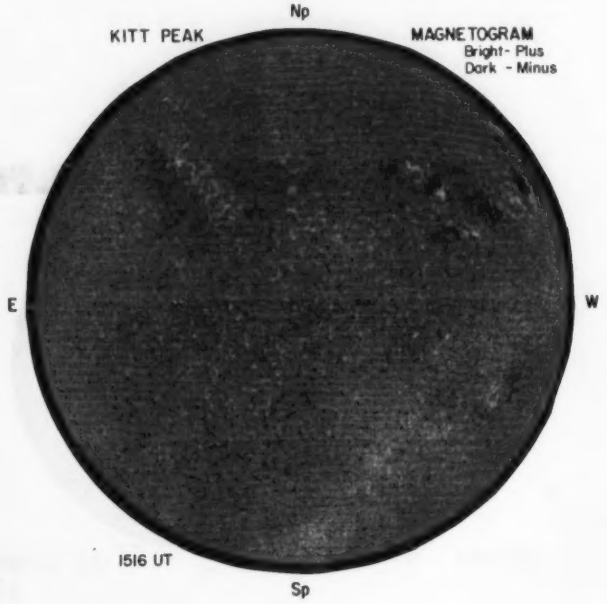
0845 UT

1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



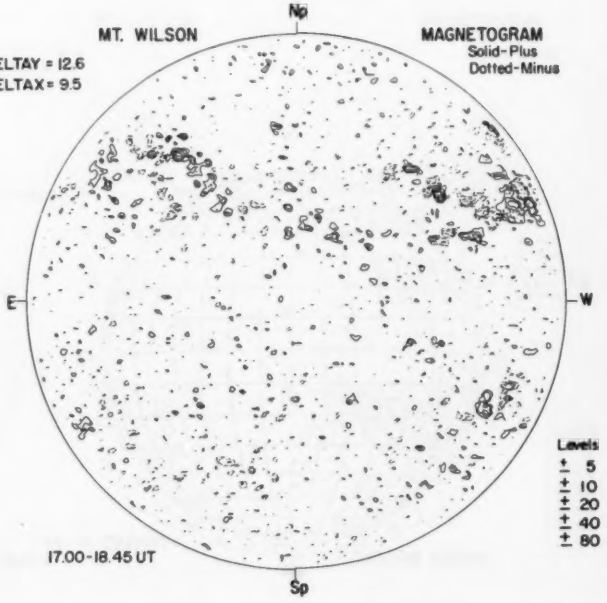
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1516 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

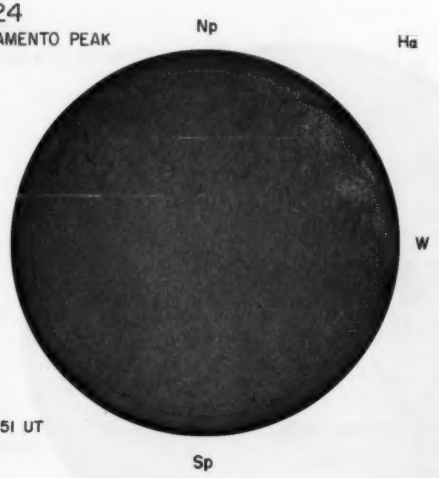
DELTAY = 12.6
DELTAX = 9.5



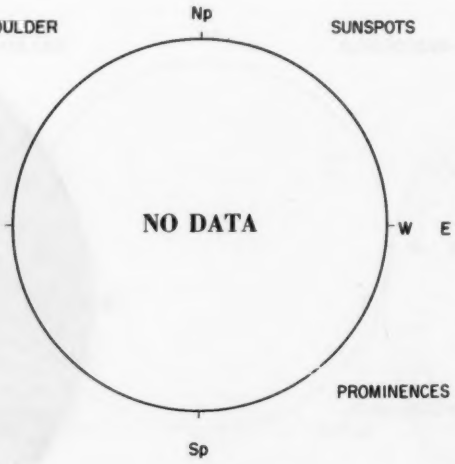
17.00-18.45 UT

24

SACRAMENTO PEAK



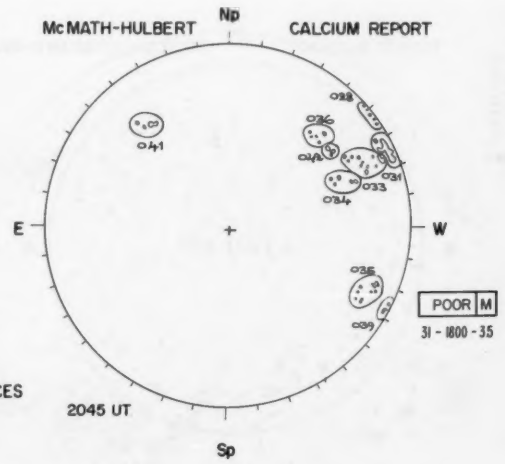
BOULDER



SUNSPOTS

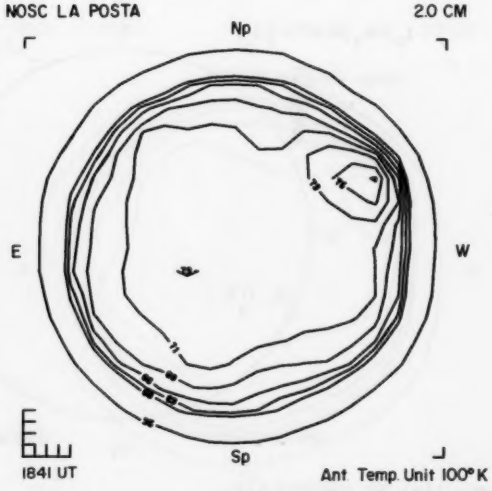
McMATH-HULBERT

CALCIUM REPORT

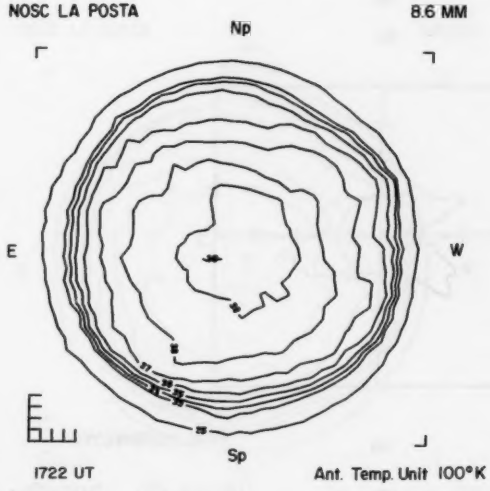


PROMINENCES

NOSC LA POSTA 2.0 CM

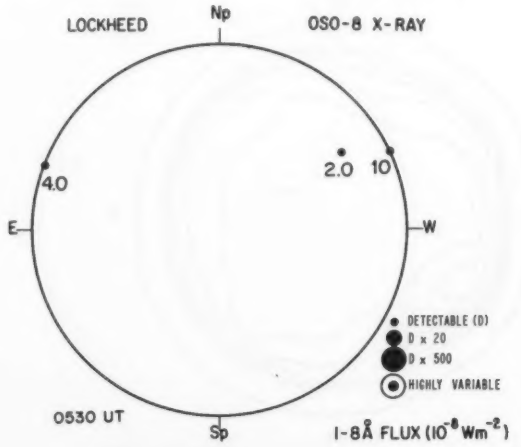


NOSC LA POSTA 8.6 MM



NOVEMBER 25, 1977 (P = 18.35, B_o = 1.61, L_o = 347.81)

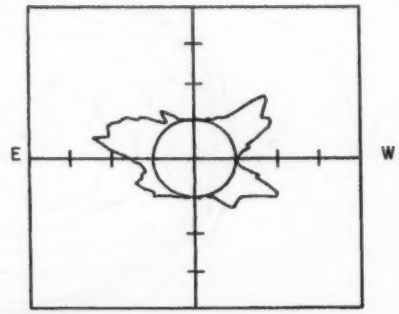
LOCKHEED OSO-8 X-RAY



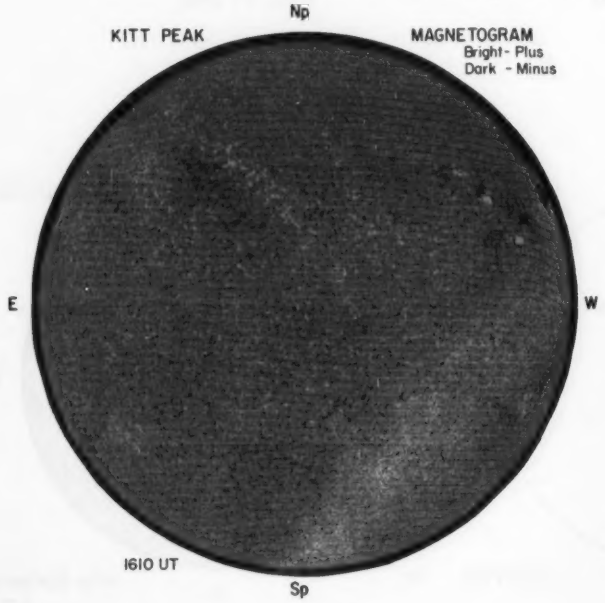
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK

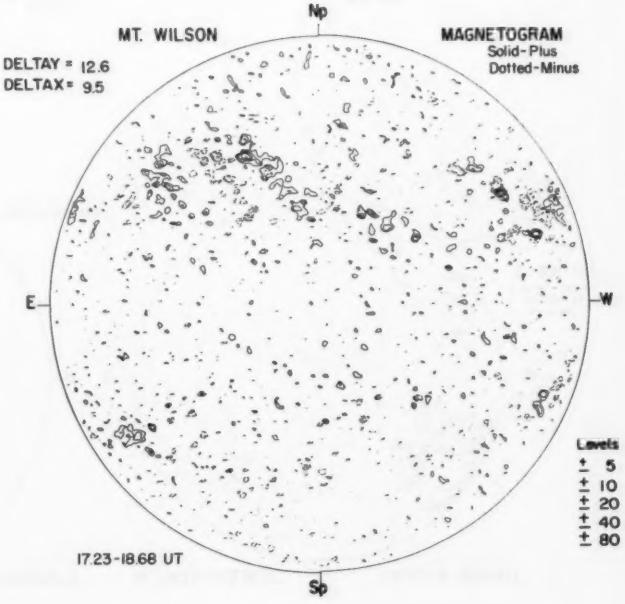
CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

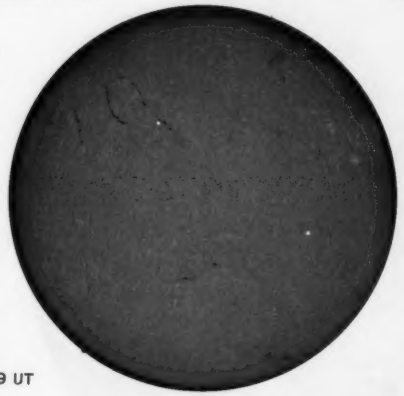


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.5



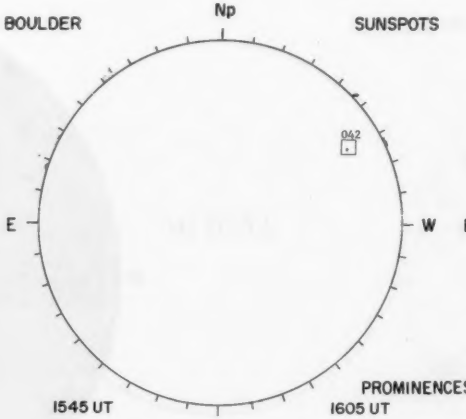
25

SACRAMENTO PEAK



1519 UT

Hα BOULDER



1545 UT

SUNSPOTS

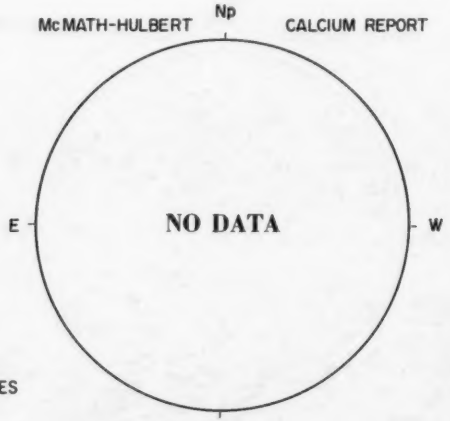
042

PROMINENCES

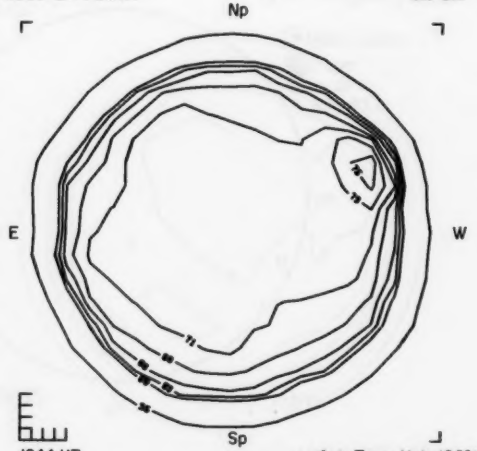
1605 UT

McMATH-HULBERT

CALCIUM REPORT



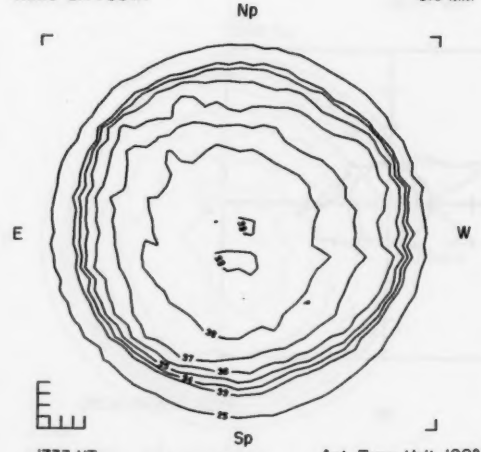
NOSC LA POSTA 2.0 CM



1844 UT

Ant. Temp. Unit 100°K

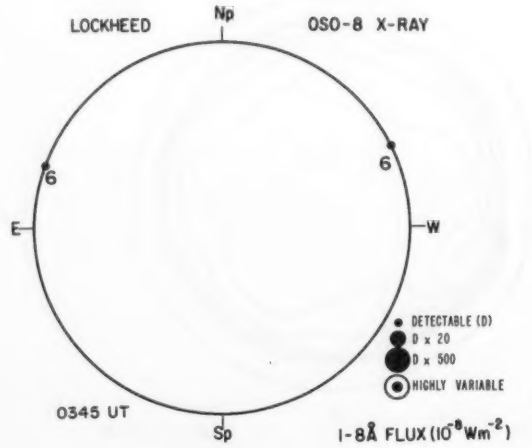
NOSC LA POSTA 8.6 MM

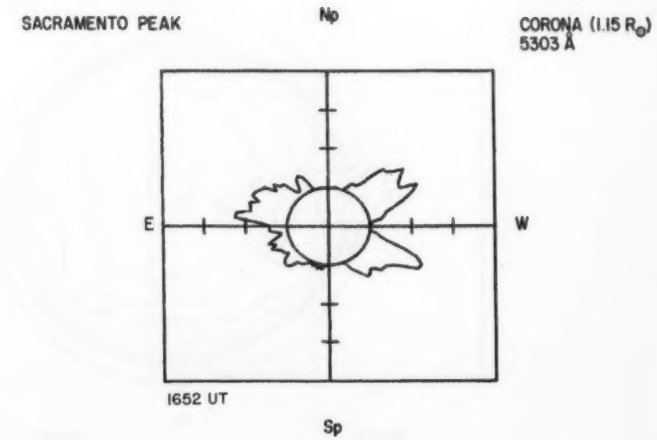


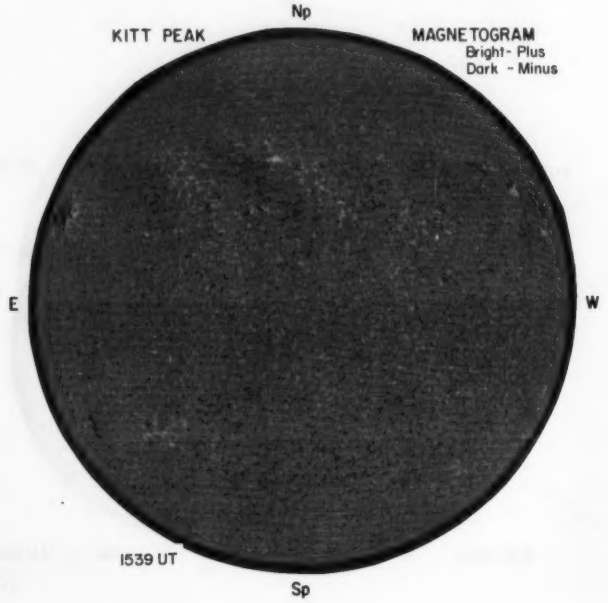
1733 UT

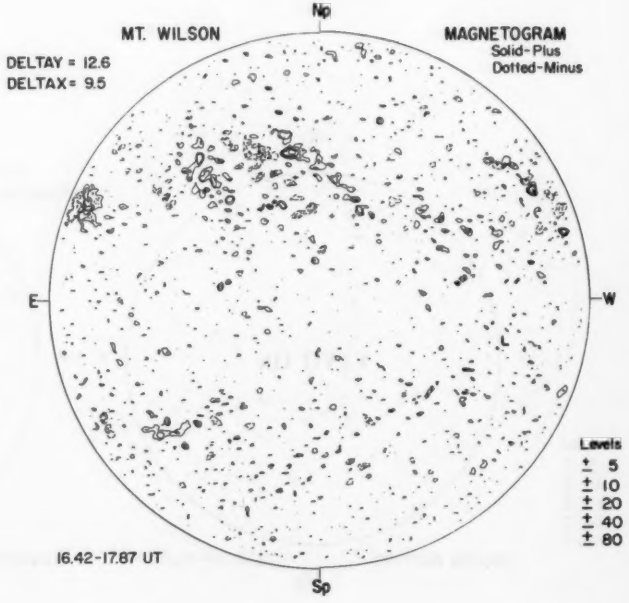
Ant. Temp. Unit 100°K

NOVEMBER 26, 1977 (P = 18.00, B_o = 1.48, L_o = 334.63)



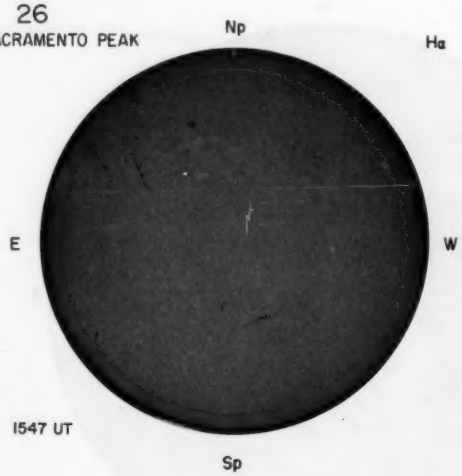






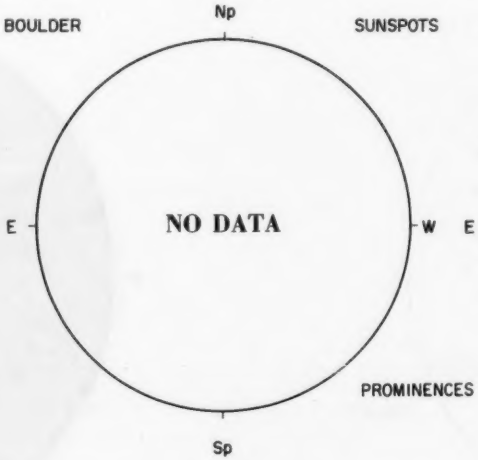
26

SACRAMENTO PEAK

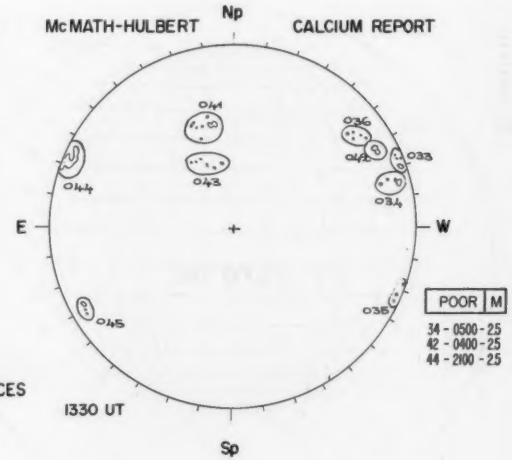


1547 UT

BOULDER

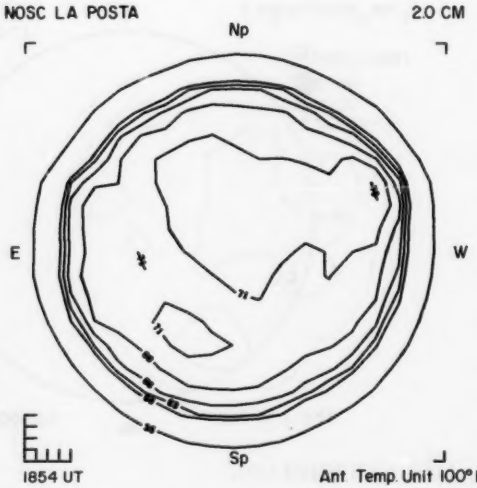


McMATH-HULBERT



1330 UT

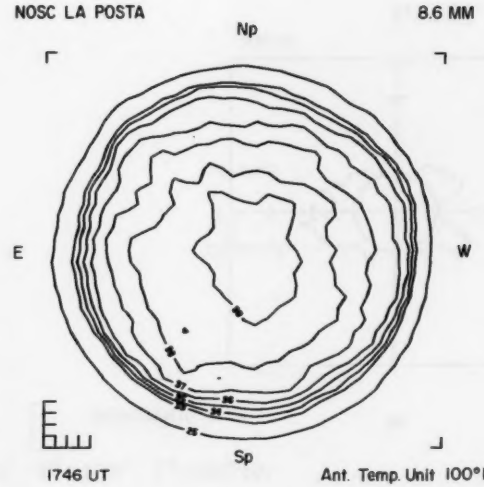
NOSC LA POSTA



1854 UT

Ant. Temp. Unit 100°K

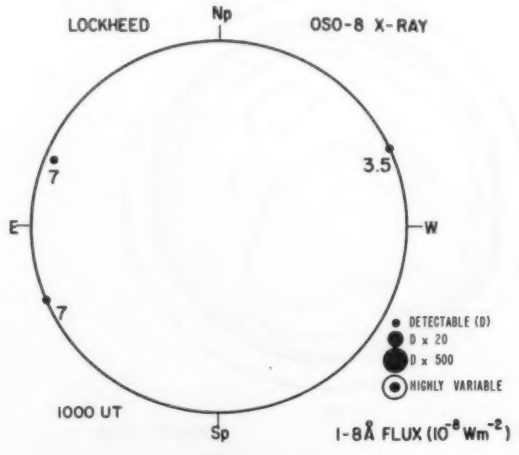
NOSC LA POSTA

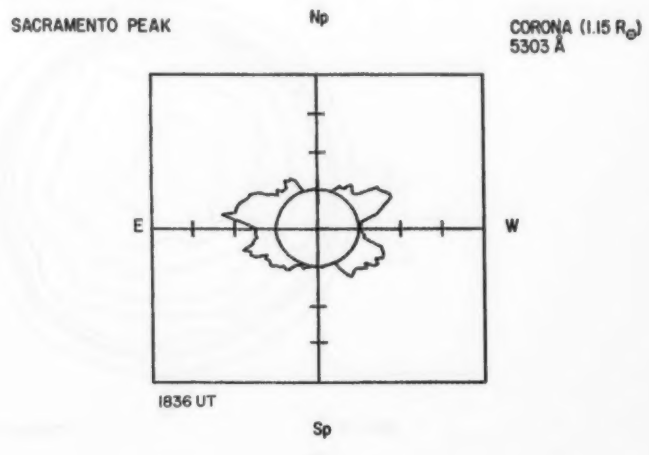


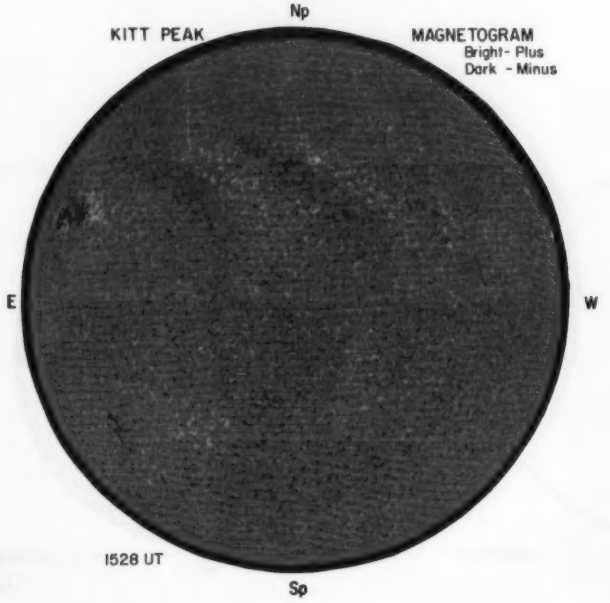
1746 UT

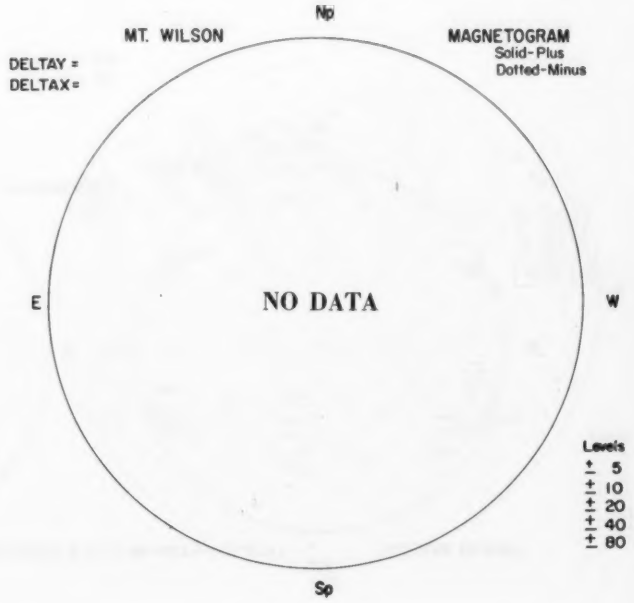
Ant. Temp. Unit 100°K

NOVEMBER 27, 1977 (P = 17.65, B_o = 1.36, L_o = 321.45)



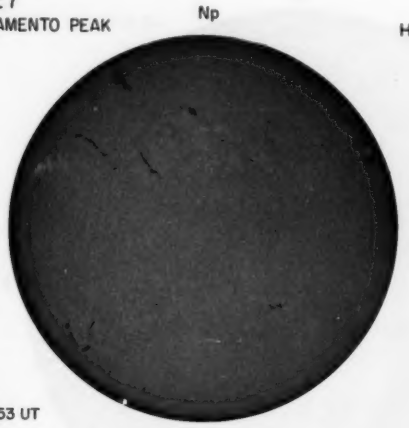






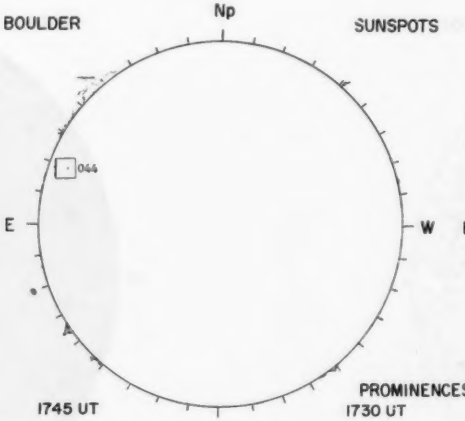
27

SACRAMENTO PEAK



1553 UT

Hα BOULDER



1745 UT

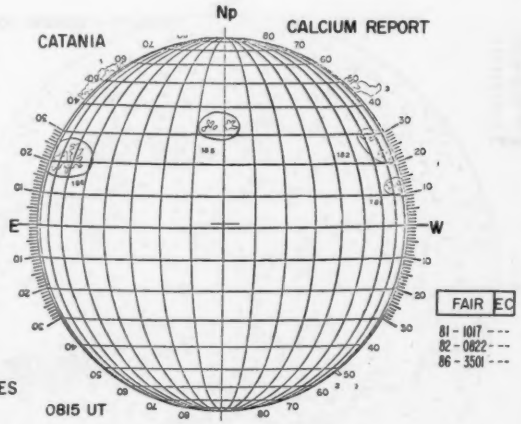
SUNSPOTS

PROMINENCES

1730 UT

CATANIA

CALCIUM REPORT

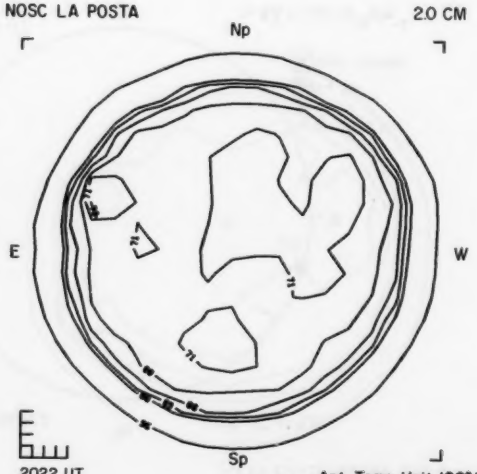


0815 UT

FAIR EC

81 - 1017 - - -
82 - 0822 - - -
86 - 3501 - - -

NOSC LA POSTA 2.0 CM



2022 UT

Ant Temp. Unit 100° K

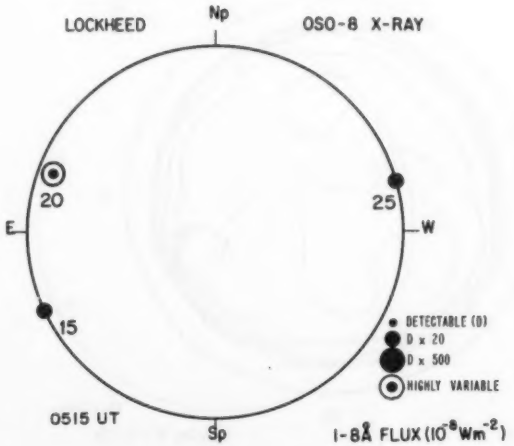
NOSC LA POSTA 8.6 MM

----UT

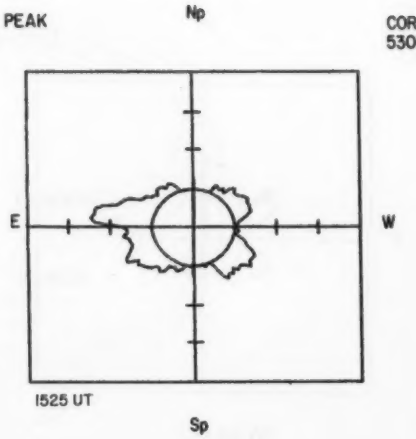
Ant. Temp. Unit 100° K

NOVEMBER 28, 1977 (P = 17.28, B_o = 1.23, L_o = 308.27)

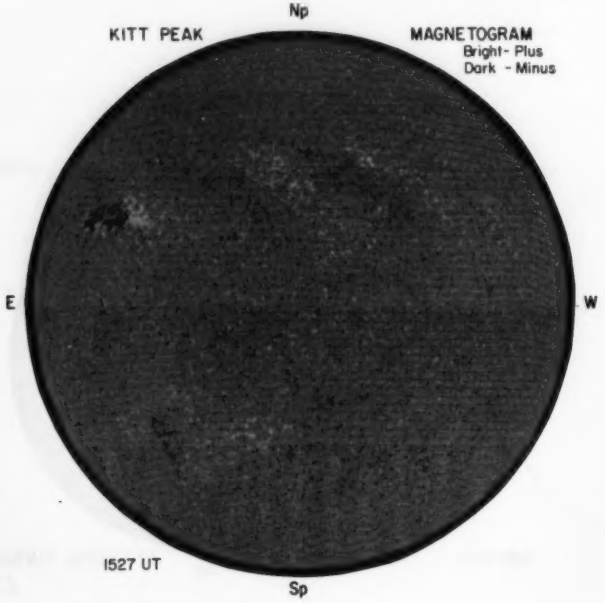
LOCKHEED OSO-8 X-RAY



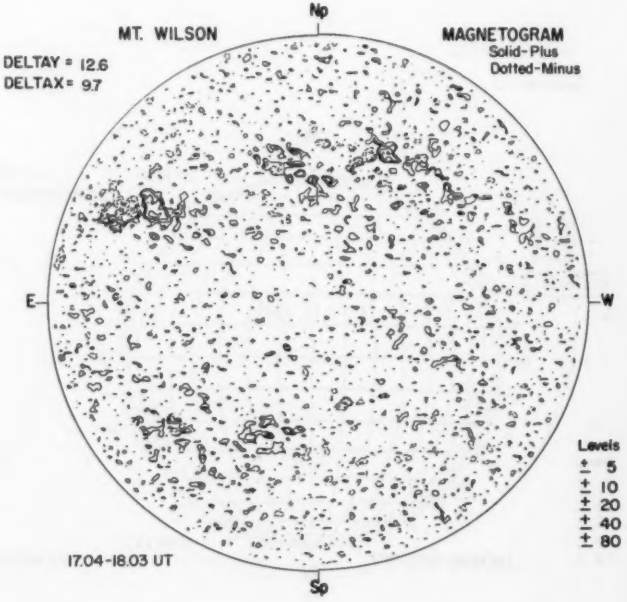
SACRAMENTO PEAK



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

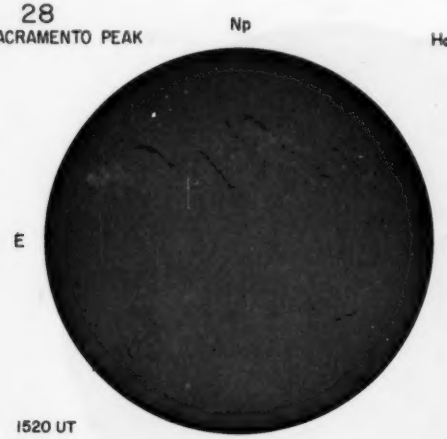


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.7



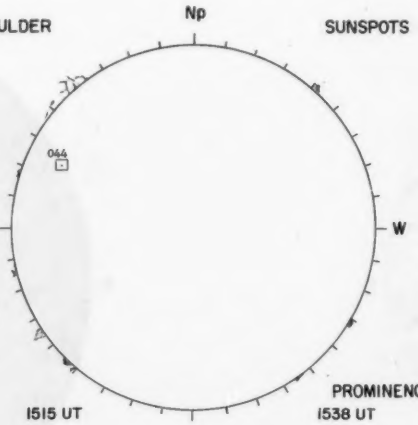
28

SACRAMENTO PEAK



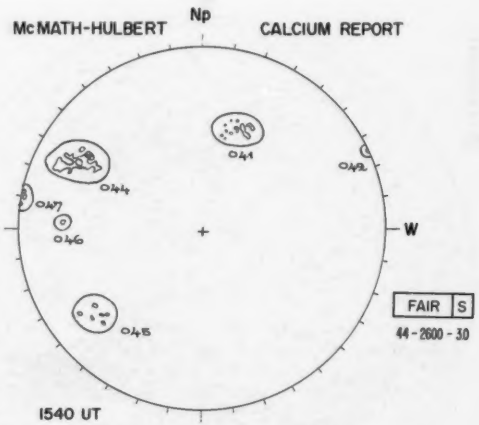
1520 UT

Hα BOULDER



1515 UT

SUNSPOTS



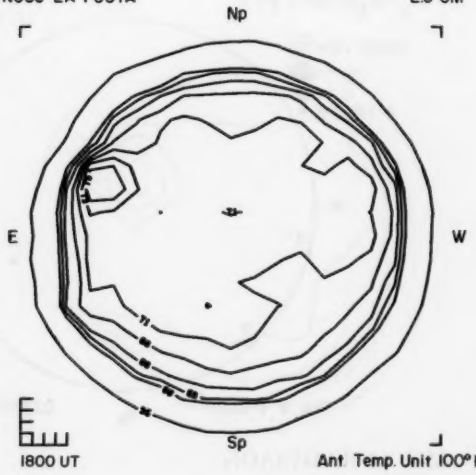
1538 UT

PROMINENCES

1540 UT

McMATH-HULBERT CALCIUM REPORT

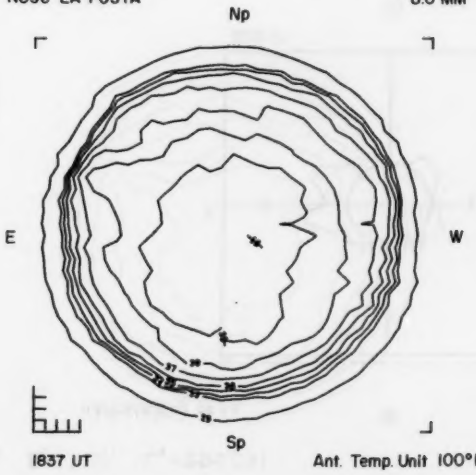
NOSC LA POSTA 2.0 CM



1800 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

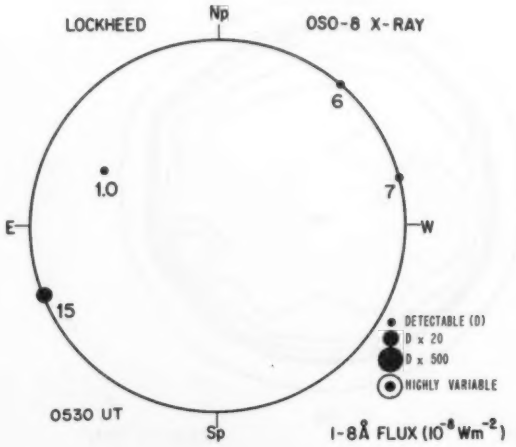


1837 UT

Ant. Temp. Unit 100°K

NOVEMBER 29, 1977 (P = 16.91, B_o = 1.11, L_o = 295.09)

LOCKHEED OSO-8 X-RAY

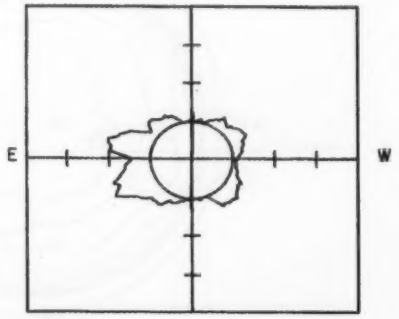


0530 UT

1-8Å FLUX (10^{-6} Wm^{-2})

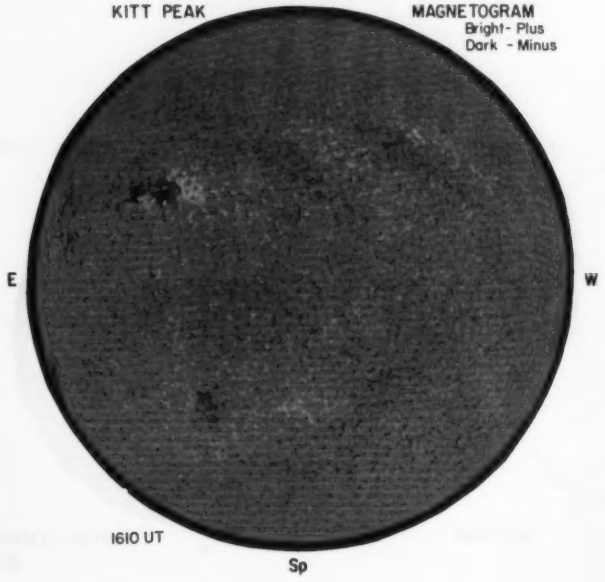
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1503 UT

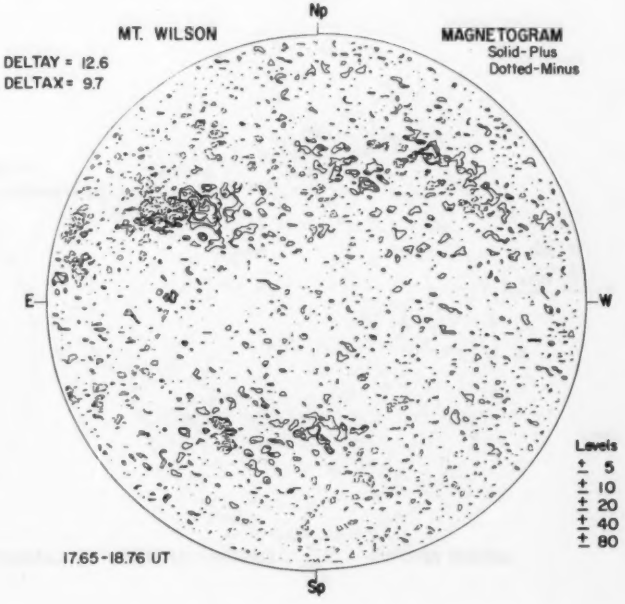
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1610 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

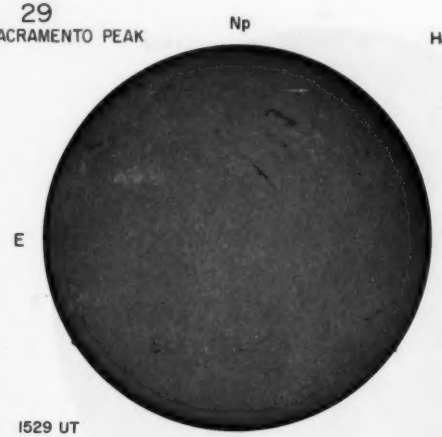
DELTAY = 12.6
DELTAX = 9.7



17.65 - 18.76 UT

29

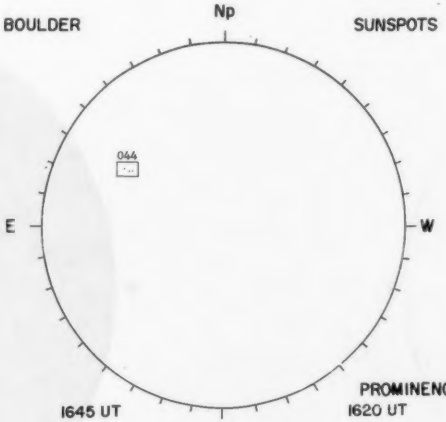
SACRAMENTO PEAK



Hα

1529 UT

BOULDER



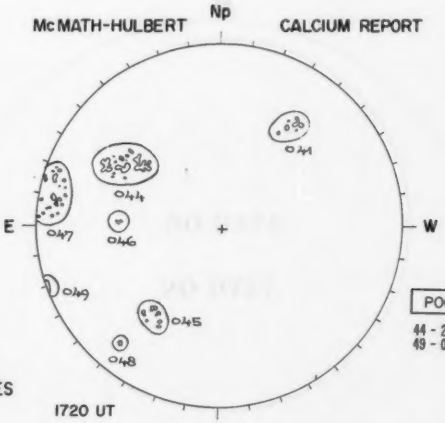
SUNSPOTS

1645 UT

PROMINENCES

1620 UT

McMATH-HULBERT



CALCIUM REPORT

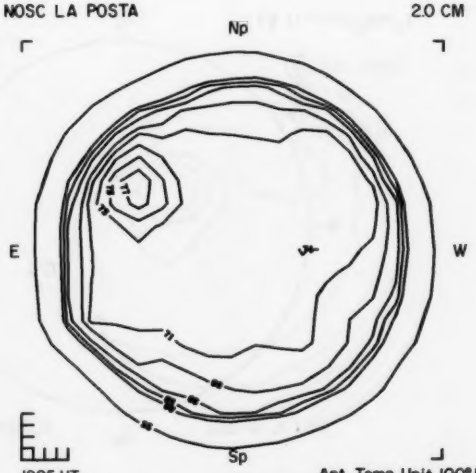
1720 UT

POOR	M

44 - 2200 - 25
49 - 0900 - 25

NOSC LA POSTA

2.0 CM

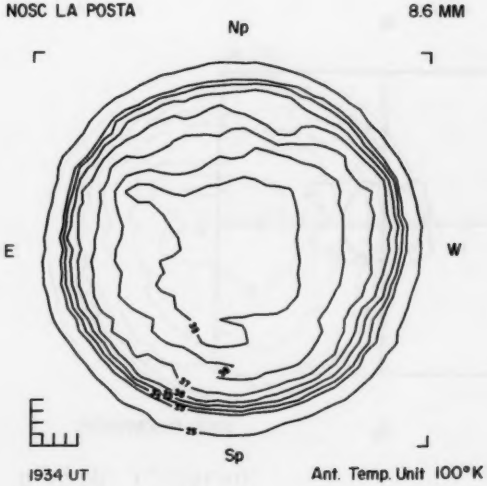


1905 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

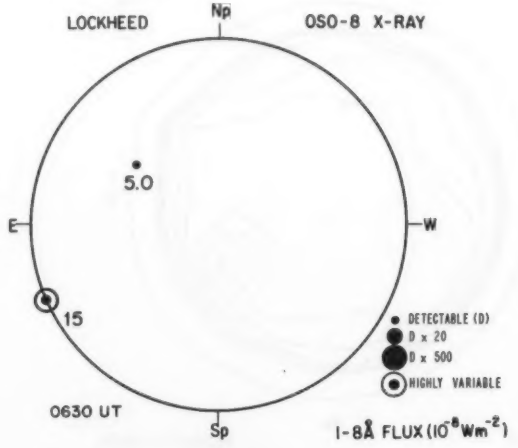


1934 UT

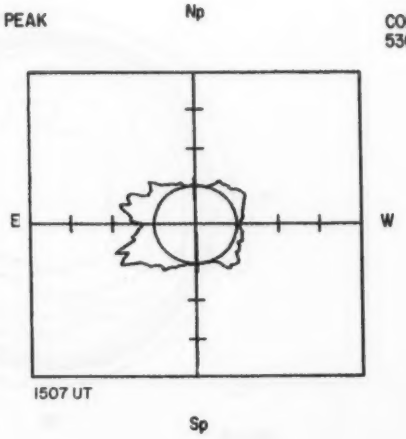
Ant. Temp. Unit 100°K

NOVEMBER 30, 1977 (P = 16.54, B_o = 0.98, L_o = 281.91)

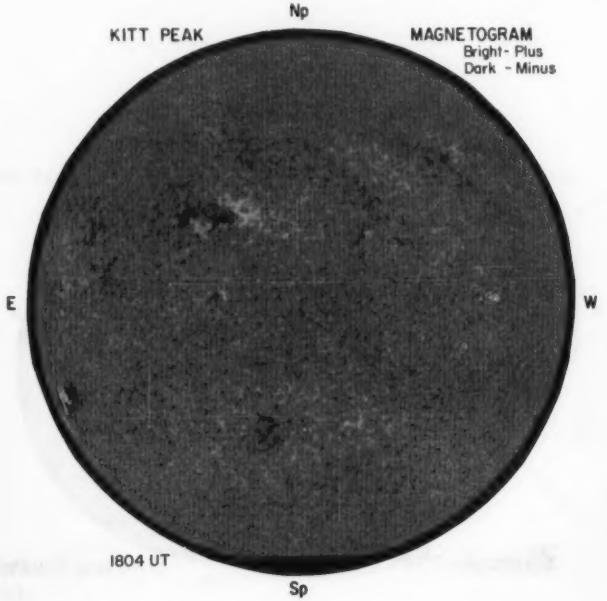
LOCKHEED OSO-8 X-RAY



SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

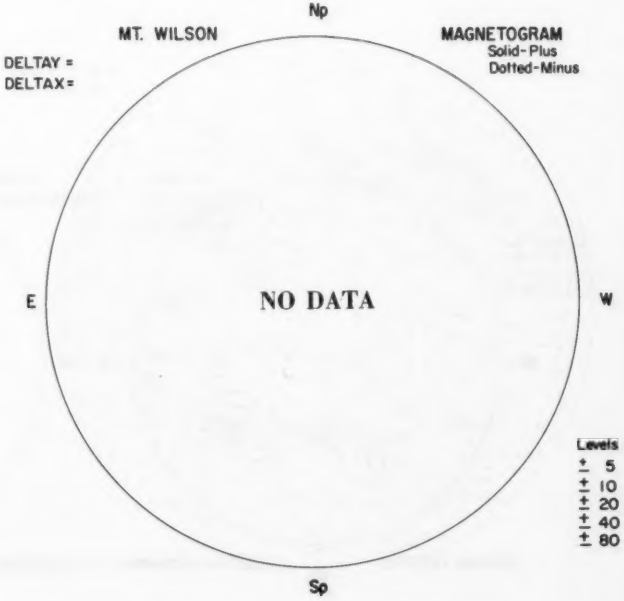


KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



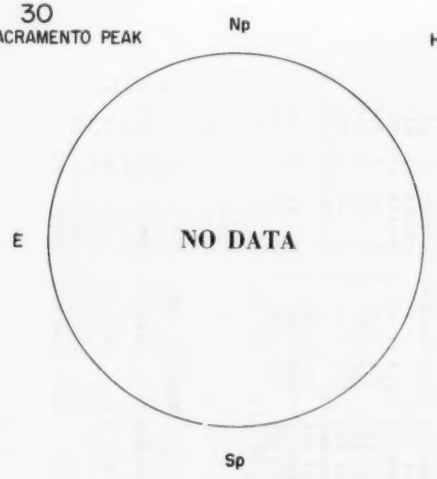
MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY =
DELTAX =

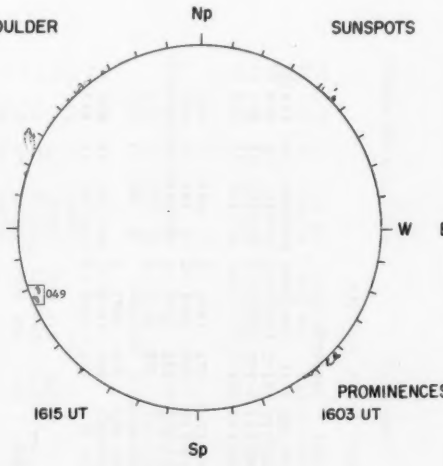


30

SACRAMENTO PEAK

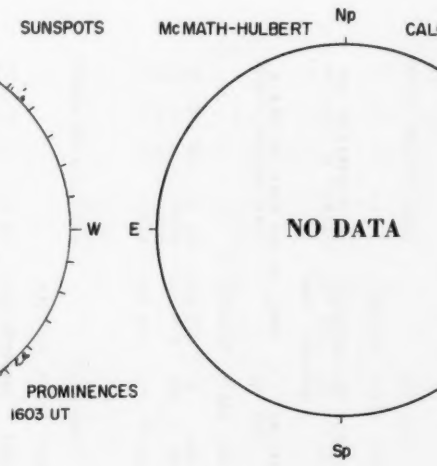


Hα BOULDER



1615 UT

SUNSPOTS

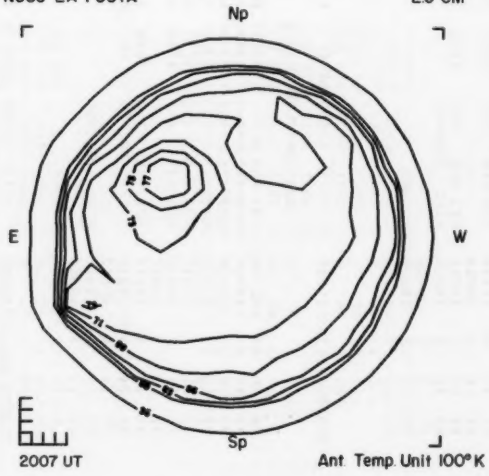


1603 UT

McMATH-HULBERT

CALCIUM REPORT

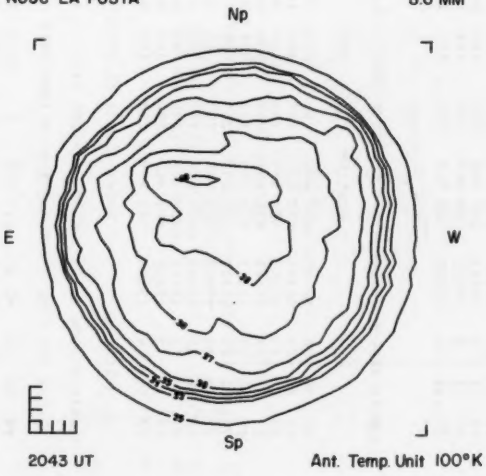
NOSC LA POSTA 2.0 CM



2007 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



2043 UT

Ant. Temp. Unit 100°K

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MCMATH REGION 15012 CMP DATE 1.5 RETURN OF REGION 14970 ROTATION 2

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
77	10	25	15012	S24 E69	297	400	1.0
77	10	26	15012	S26 E76	300	500	1.5
77	10	27	15012	S25 E63	298	600	1.5
77	10	28	15012	S25 E49	299	500	1.5
77	10	29	15012	S25 E35	299	400	1.5
77	10	30	15012	S25 E24	299	600	1.5
77	10	31	15012	S25 E11	299	700	1.5
77	11	1	15012	S25 W03	297	500	1.0
77	11	2	15012	S25 W15	297	400	1.0
77	11	4	15012	S26 W41	295	400	1.0

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS

MCMATH REGION 15013 CMP DATE 1.6 RETURN OF REGION 14962 ROTATION 2

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
77	10	25	15013	N22 E39	297	300	1.0
77	10	26	15013	N21 E25	291	1100	3.0
77	10	27	15013	N21 E68	293	900	3.5
77	10	28	15013	N22 E53	295	900	3.0
77	10	29	15013	N22 E40	294	600	2.5
77	10	30	15013	N22 E28	295	600	3.0
77	10	31	15013	N22 E13	297	700	2.5
77	11	1	15013	N21 W01	295	600	2.0
77	11	2	15013	N21 W12	294	300	2.0
77	11	4	15013	N21 W39	293	500	2.0

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS

MCMATH REGION 15016 CMP DATE 3.7

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
77	10	28	15016	S24 E44	264	1600	3.0
77	10	29	15016	S24 E70	264	2000	3.0
77	10	30	15016	S23 E56	267	1200	3.0
77	10	31	15016	S22 E41	269	1200	3.0
77	11	1	15016	S23 E28	266	1700	3.0
77	11	2	15016	S23 E16	266	1500	2.5
77	11	3	15016				
77	11	4	15016	S23 W13	267	1500	3.0
77	11	5	15016				
77	11	6	15016				
77	11	7	15016				
77	11	8	15016				

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
19884	S22 E76	272	AP	3	B	100	1	HSX
19884	S23 E63	272	(AP)	3	B	130	1	HSX
19884	S22 E49	273	(Y)	4	B	100	4	CAO
19884	S23 E24	271	(BF)	5	B	110	3	HSX
19884	S23 E11	269	(AP)	4	B	100	4	HSX
19884	S23 W02	270	(AP)	5	B	120	5	HSX
19884	S23 W15	270	(AP)	4	B	130	2	HSX
	S22 W29				B	60	4	HSX
19884	S23 W40	269	(AP)	4				
19884	S23 W53	268	(AP)	4	B	80	1	HSX
19884	S23 W68	266	(AP)	3	H	80	1	HSX

MCMATH REGION 15017 CMP DATE 5.1

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
77	10	29	15017	N20 E35	249	1000	3.5
77	10	30	15017	N22 E75	249	1300	4.0
77	10	31	15017	N22 E60	250	1300	3.5
77	11	1	15017	N21 E46	248	1700	3.0
77	11	2	15017	N21 E33	249	1700	3.0
77	11	3	15017				
77	11	4	15017	N20 E05	243	1600	3.0
77	11	5	15017				
77	11	6	15017				
77	11	7	15017				
77	11	8	15017				

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
19885	N20 E70	252	(BP)	4	B	120	5	DAO
	N21 E55				B	230	6	DSO
19885	N20 E43	252	(B)	5	B	180	6	DSO
19885	N20 E29	251	(B)	5	B	90	6	DSO
19885	N20 E16	252	(BP)	5	B	150	5	EHO
19885	N20 E02	253	(B)	5	B	40	5	CAO
	N20 W09				B	120	16	CSO
19885	N21 W28	257	(AP)	4				
19885	N21 W41	256	(AP)	4	B	40	7	CRO
19885	N20 W58	256	(AP)	3	H	30	4	BXO

MCMATH REGION 15023 CMP DATE 7.3

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
77	11	11	15023	S19 W60	220	100	1.0

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H STA	AREA	CNT	CLASS

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MCMATH REGION 15021 CMP DATE 8.5 RETURN OF REGION 14979 ROTATION 3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
77	11	1	15021	N10 E30	204	1400	2.0								
77	11	2	15021	N11 E17	205	2200	2.0	19887	N08 E70	210	X	1			
77	11	4	15021	N10 E48	206	2500	3.0								
77	11	11	15021	N11 W45	205	2500	2.5								
77	11	12	15021	N11 W55	205	2500	2.5								
77	11	13	15021	N11 W67	204	2500	2.0								

MCMATH REGION 15022 CMP DATE 9.5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
77	11	4	15022	S25 E63	191	400	2.5								

MCMATH REGION 15032 CMP DATE 9.8

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
77	11	13	15032	S25 W49	186	200	2.0								
77	11	14	15032					19891	S24 W66	188	(BP)	4	B	50	6 BXO
77	11	15	15032	S25 W78	188	1800	2.5	19891	S24 W79	188	B	3			

MCMATH REGION 15024 CMP DATE 11.3 RETURN OF REGION 14993 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
77	11	11	15024	N25 W07	167	300	2.0								
77	11	12	15024	N25 W16	166	400	2.0								
77	11	13	15024	N25 W31	168	600	2.0								
77	11	15	15024	N25 W56	166	500	1.0								
77	11	16	15024	N24 W70	166	400	1.0								

MCMATH REGION 15026 CMP DATE 12.9

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
77	11	9	15026					19889	S23 E44	144	(BF)	4	B	40	5 BXO
77	11	10	15026					19889	S23 E27	145	(B)	4	B	20	4 BXO
77	11	11	15026	S23 E15	145	900	3.0	19889	S23 E15	144	(BF)	3	B	30	10 CHX
77	11	12	15026	S23 E05	145	900	3.0	19889	S22 E05	144	(AF)	3	H	30	7 CFO
77	11	13	15026	S23 W05	142	900	3.0	19889	S23 W08	142	(AF)	3	B	20	5 BXO
77	11	14	15026					19889	S22 W22	144	(B)	3			
77	11		15026					19892	S25 W14	136	(AP)	4	B	0	1 AXX
77	11	15	15026	S23 W31	141	1100	3.0	19889	S23 W33	142	(AP)	4	B	20	1 HSX
77	11		15026					19892	S25 W27	136	(AP)	3	B	10	2 AXX
77	11	16	15026	S24 W46	142	1400	3.5	19889	S24 W47	140	(B)	3	B	10	1 AXX
77	11	17	15026	S24 W59	142	1700	3.5	19889	S25 W60	142	(Y)	4	H	10	1 AXX
77	11	18	15026					19889	S25 W71	141	B	2	B	30	2 BXO
77	11	19	15026	S26 W45	143	900	2.0								

MCMATH REGION 15025 CMP DATE 13.2 RETURN OF REGION 14984 ROTATION 2 AND 3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
77	11	7	15025					19888	N24 E77	138	(AP)	3	B	70	1 HSX
77	11	8	15025					19888	N24 E61	137	(AP)	3	H	40	1 HSX
77	11	9	15025					19888	N24 E51	137	(AP)	4	B	10	1 AXX
77	11	10	15025					19888	N24 E35	137	(AP)	4	B	10	1 AXX
77	11	11	15025	N22 E18	142	1200	2.0	19888	N24 E23	136	(AP)	4	B	20	1 HSX
77	11	12	15025	N22 E08	142	1200	2.5	19888	N24 E13	136	(BP)	4	H	20	1 HSX
77	11	13	15025	N22 W04	141	1800	2.5	19888	N24 W02	136	(AP)	4	B	30	4 CFO
77	11	14	15025					19888	N24 W13	135	(AP)	4	B	0	2 AXX
77	11	15	15025	N22 W31	141	1300	2.0								
77	11	16	15025	N22 W46	142	800	2.5	19888	N25 W43	136	(AP)	4	B	10	1 HSX
77	11	17	15025	N22 W60	143	800	2.5	19888	N25 W52	134	(B)	2	H	10	1 AXX
77	11	19	15025	N24 W35	143	500	2.0								

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MCMATH REGION 15027 CMP DATE 16.0 RETURN OF REGION 14991 ROTATION 2

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	11	15027	N27 E58	102	500	3.0									
77	11	12	15027	N27 E48	102	500	3.0									
77	11	13	15027	N28 E36	101	500	2.5									
77	11	15	15027	N28 E05	105	100	1.0									
77	11	16	15027	N29 W09	105	100	1.0									
77	11	17	15027	N29 W21	104	200	1.0									
77	11	19	15027	N29 W46	104	200	1.5									

MCMATH REGION 15037 CMP DATE 16.2

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	19	15037	N14 W45	103	100	1.5									
77	11	21	15037	N14 W72	103	100	1.5									

MCMATH REGION 15029 CMP DATE 17.1

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	11	15029	N20 E70	90	100	1.5									
77	11	12	15029	N20 E60	90	100	1.5									

MCMATH REGION 15040 CMP DATE 17.3

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	21	15040	N14 W57	88	200	2.5									

MCMATH REGION 15030 CMP DATE 18.2 RETURN OF REGION 14995 ROTATION 4

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	11	15030	S28 E65	75	700	1.0									
77	11	12	15030	S27 E75	75	800	2.0									
77	11	13	15030	S26 E61	76	700	2.5									
77	11	15	15030	S26 E35	75	400	1.5									
77	11	16	15030	S26 E19	77	400	1.5									
77	11	17	15030	S26 E07	76	400	1.5									
77	11	19	15030	S26 W20	78	400	1.5									
77	11	21	15030	S26 W46	77	400	1.5									

MCMATH REGION 15028 CMP DATE 18.4

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	11	15028	N36 E30	80	1400	3.0	19890	N36 E76	83	(BP)	3	B	80	1	HSX
77	11	12	15028	N37 E70	80	2400	3.0	19890	N37 E67	82	(BP)	4	H	80	1	HSX
77	11	13	15028	N37 E60	77	2200	3.0	19890	N37 E55	79	(BP)	4	B	210	5	DAO
77	11	14	15028					19890	N37 E44	78	(BP)	4	B	80	2	DSO
77	11	15	15028	N37 E34	76	1700	3.0	19890	N38 E30	79	(AP)	5	B	50	4	DSI
77	11	16	15028	N37 E20	76	1400	3.0	19890	N38 E15	78	(B)	4	B	40	2	DSO
77	11	17	15028	N38 E09	74	1400	3.0	19890	N38 E06	76	(BP)	5	H	90	11	DRI
77	11	18	15028					19890	N38 W07	77	(BP)	4	B	20	2	CSO
77	11	19	15028	N37 W14	72	1500	2.5		N38 W19				B	20	0	HXX
77	11	20	15028					19890	N38 W32	76	(AP)	4	B	10	1	AXX
77	11	21	15028	N37 W38	69	1500	2.0	19890	N38 W44	74	(AP)	3				
77	11	24	15028	N37 W80	68	900	1.5									

MCMATH REGION 15039 CMP DATE 19.2

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	19	15039	S26 W05	63	100	1.5									
77	11	21	15039	S26 W33	64	300	1.5									

Cont'd

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MCMATH REGION 15039 (CONT) CMP DATE 19.2

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	24	15039	S27 W77	65	400	1.0									

MCMATH REGION 15031 CMP DATE 19.3

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	12	15031	N26 E80	70	200	1.0									
77	11	13	15031	N26 E70	67	400	1.0									
77	11	15	15031	N26 E50	60	200	2.0	19894	N22 E48	61	(B)	3	B	10	2	AXX
77	11	16	15031	N26 E34	62	600	3.0	19894	N24 E30	63	(BP)	4	B	10	1	AXX
77	11	17	15031	N26 E22	61	1200	3.5	19894	N23 E20	62	(B)	5	H	110	15	CRI
77	11	18	15031					19894	N23 E09	61	(B)	4	B	440	21	DAC
77	11	19	15031	N25 W04	62	1300	3.5		N23 W04				B	420	0	HXX
77	11	20	15031					19894	N24 W17	61	(B)	5	B	230	16	DAI
77	11	21	15031	N25 W30	61	1500	3.0	19894	N24 W29	59	(BF)	4	B	180	4	DAC
77	11	23	15031					19894	N24 W56	59	(BF)	4	B	120	9	DRI
77	11	24	15031	N25 W74	62	1300	3.5	19894	N24 W68	59	(AF)	2				

MCMATH REGION 15038 CMP DATE 19.4

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	19	15038	S20 W02	60	100	1.0									

MCMATH REGION 15033 CMP DATE 20.6 RETURN OF REGION 15015 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	13	15033	N22 E88	49	500	1.0									
77	11	15	15033	N21 E69	41	1400	2.0									
77	11	16	15033	N22 E53	43	1000	2.5									
77	11	17	15033	N22 E40	43	900	2.5									
77	11	19	15033	N22 E13	45	1200	2.5									
77	11	21	15033	N22 W14	45	1200	2.5									
77	11	24	15033	N22 W55	43	900	2.0									
77	11	26	15033	N22 W78	45	500	2.0									

MCMATH REGION 15035 CMP DATE 20.9 RETURN OF REGION 15005 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	14	15035					19893	S20 E75	47	(B)	3	B	10	2	AXO
77	11	15	15035	S19 E68	42	1200	2.5	19893	S19 E62	47	(B)	3	B	30	2	CRO
77	11	16	15035	S18 E53	43	900	3.0	19893	S18 E43	50	(AP)	4	B	10	1	HSX
77	11	17	15035	S18 E41	42	900	2.5	19893	S17 E33	49	(AP)	4	H	20	1	HRX
77	11	18	15035					19893	S20 E18	52	(AP)	3	B	20	2	HSX
77	11	19	15035	S20 E15	43	1200	2.5		S18 E07				B	20	0	HXX
77	11	21	15035	S20 W10	41	1100	2.5									
77	11	24	15035	S20 W54	42	600	2.0									
77	11	26	15035	S20 W78	45	400	1.0									

MCMATH REGION 15034 CMP DATE 22.0

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	15	15034	N14 E85	25	600	2.5									
77	11	16	15034	N16 E70	26	600	3.0	19895	N15 E63	30	(AP)	1				
77	11	17	15034	N16 E57	26	700	3.0	19895	N15 E54	28	(BP)	3	H	10	1	AXX
77	11	18	15034						N14 E37				B	10	1	AXX
77	11	19	15034	N16 E31	27	800	2.5									
77	11	21	15034	N16 E05	26	500	2.0									
77	11	24	15034	N16 W40	28	300	2.0									
77	11	25	15034					19897	N15 W55	34	X	1				
77	11	26	15034	N16 W64	31	500	2.5									

REGIONS OF SOLAR ACTIVITY

NOVEMBER 1977

MCMATH REGION 15042 CMP DATE 22.2

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	23	15042					19896	N24 W22	25	(AP)	4	B	20	3	AXX
77	11	24	15042	N26 W35	23	300	2.0	19896	N25 W35	26	(AP)	3				
77	11	25	15042					19896	N25 W48	27	(AP)	3	B	30	1	HSX
77	11	26	15042	N26 W50	27	400	2.5	19896	N25 W62	28	(AP)	2	R	20	1	HRX
77	11	27	15042						N25 W75				R	10	1	AXX
77	11	28	15042	N26 W48	27	100	1.0									

MCMATH REGION 15036 CMP DATE 22.5

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	16	15036	N32 E48	16	300	2.0									
77	11	17	15036	N32 E56	17	500	2.0									
77	11	19	15036	N31 E40	18	600	2.0									
77	11	21	15036	N31 E11	20	400	2.0									
77	11	24	15036	N31 W12	20	300	1.0									
77	11	26	15036	N31 W54	21	300	1.0									

MCMATH REGION 15043 CMP DATE 27.2

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	26	15043	N21 E09	316	300	1.0									

MCMATH REGION 15041 CMP DATE 27.3 RETURN OF REGION 15008 ROTATION 3

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	11	21	15041	N35 E38	312	700	1.0									
77	11	24	15041	N36 E13	315	500	2.0									
77	11	26	15041	N36 E10	317	500	2.0									
77	11	28	15041	N35 W18	317	500	1.5									
77	11	29	15041	N35 W29	314	500	1.5									
77	12	02	15041	N34 W56		400	1.5									
77	12	03	15041	N34 W79		400	1.0									

MCMATH REGION 15050 CMP DATE 28.1

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	12	02	15050	N21 W60		100	1.5									

MCMATH REGION 15051 CMP DATE 29.6

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	12	02	15051	N15 W40		100	1.5									
77	12	03	15051	N15 W54		500	2.5	19900	N19 W54		(B)	3	B	500	1	H
77	12	04	15051	N15 W67		600	3.0	19900	N16 W59		(B)	4	B	600	5	C
77	12	05	15051					19900	N16 W82		X	2				

DAILY CALCIUM PLAGE INDEX

NOVEMBER 1977

DAILY CALCIUM PLAGE INDEX

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
77	11	1	14.6	77	11	11	10.6	77	11	21	13.3
77	11	2	13.3	77	11	12	12.4	77	11	22	*
77	11	3	*	77	11	13	13.8	77	11	23	*
77	11	4	16.2	77	11	14	*	77	11	24	4.9
77	11	5	*	77	11	15	11.6	77	11	25	*
77	11	6	*	77	11	16	13.0	77	11	26	3.7
77	11	7	*	77	11	17	15.6	77	11	27	*
77	11	8	*	77	11	18	*	77	11	28	6.1
77	11	9	*	77	11	19	17.6	77	11	29	6.4
77	11	10	*	77	11	20	*	77	11	30	*

* NO OBSERVATIONS

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on November 3, 5-10, 14, 18, 20, 22, 23, 25, 27 and 30, 1977.
No sunspot observations were made at Mt. Wilson on November 5, 19 and 22, 1977.

SUDDEN IONOSPHERIC DISTURBANCES

NOVEMBER 1977

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
05	2340	0017	2348	1-	1				1				2339	X-RAY
08	1747	1841	1749	1-	1	1							*	
08	1941	2025	1943	1-	1	1							*	
18	1645	1815	1700	1-	5			1			9		1644	X-RAY
20	1137U	1220	1207	1-	1			1					1132	15033
22	0423	0500	0428	1-	1				1				0424	10533
22	0948	1152	1010	2-	5	2		3	3		2		0945	10533
24	1406U	1416	1409	1-	1			1					*	
30	0334	0356	0349	1-	1				1				0330	X-RAY

PERIODS OF NO OBSERVATIONS:

DATE	TIME (UT) and STATION
06	1309-1520 UM (10 kHz and 13 kHz)
07	0000-2400 A34
08	2125-2325 UM (10 kHz and 13 kHz)
09-10	0000-2400 A28
15	0000-2400 TN
16	0120-0210 UM (13 kHz), 1215-1519 UM (10 kHz and 13 kHz)
18-21	0000-2400 A37
21	0312-0408 TM
22	0000-2400 TN
23	0614-1508 TM
29-30	1325-1520 UM (10 kHz)

STATIONS REPORTING FOR NOVEMBER 1977

AAVSO (A1, A19, A21, A28, A30, A31, A34, A35, A37, A40) (SES)
(A1, A31) (SEA) (A31) (SWF)
DARMSTADT (DA) (SWF)
HAWAII (HI) (SFD)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA, SES)
INUBO (IN) (SPA)
KONA (KN) (SPA)
KUHLUNGSBORN (KU) (SEA, SPA)
MAUI (MU) (SFD)
MC MATH (MC) (SWF, SCNA)
NEW JERSEY (NJ) (SES)
PANSKA VES (PU) (SWF, SEA, SES)
SOFIA (SF) (SES)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
TORINO (TN) (SPA)
UPICE (UI) (SEA)

SID's BY McMATH REGION

NOVEMBER 1977

DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
REGION 10533																				1		2								
X-RAY				1														1												1
UNKNOWN																														
NO FP								2																1						

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

NOVEMBER 1977

NOV 1977	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
01	0000	0910	MANI										
	0630	1550	DURN				0715.4	0715.4					IIIW
			DURN				0716.7	0716.7					IIIW
			DURN				0736.2	0736.4	2				IIIG
			DURN				0800	1550 D	1				IC,DC,N
	1121	2132	SGMR										
	1332	2345	HARV				1528	1852	1				IN,W
			HARV				1728	1732	3	1728	1729	3	IIIG
			HARV				1758		2	1758		2	IIIB
			HARV				1805		2				IIIG
			HARV				1850		2				IIIG
	2153	2400	MANI										
02	0000	0909	MANI										
	0633	1545	DURN				0633 E	1545	1				IC,DC,N
	1123	2131	SGMR										
	1332	2345	HARV				1834		1				IIIB
	2153	2400	MANI										
03	0000	0909	MANI										
	0634	1540	DURN				0634 E	1540	1				IC,DC,N
	0953	1459	DWIN				0953	1400	1				IS
	1124	2129	SGMR										
	1332	2345	HARV										
	2153	2400	MANI										
04	0000	0909	MANI										
	0636	1334	DURN				0636 E	0730	1				IC,DC,N
	1125	2128	SGMR										
	1332	2340	HARV										
	1048	1419	DWIN				1414.6	1414.7	2				IIIG
	2154	2400	MANI										
05	0000	0910	MANI										
	0637	1538	DURN										
	1126	2127	SGMR										
	1348	2340	HARV				1726	1728	2	1726	1728	2	IIIG
	2153	2400	MANI										
06	0000	0909	MANI										
	0639	1537	DURN										
	1128	2126	SGMR										
	1345	2340	HARV				1919	1922	3	1919	1922	3	IIIG
	2153	2400	MANI										
07	0000	0910	MANI							0546.0	0556.2	1	CONT
	0640	1535	DURN				0755	0811	1				IC,DC,N
	1129	2125	SGMR										
	2153	2400	MANI										
	2217	2340	HARV										
08	0000	0909	MANI										
	0642	1532	DURN	1100.0	1100.1	1	1100.0	1100.2	3				IIIG
	1130	2123	SGMR										
			DURN	1215.4	1216.2	1	1215.8	1216.2	3				IIIG
	1345	2340	HARV										
	2153	2400	MANI										
09	0000	0024	MANI										
	0034	0710	MANI										
	0644	1530	DURN										
	0735	0909	MANI										
	1132	2122	SGMR										
	1345	2340	HARV										
	2154	2400	MANI										
10	0000	0909	MANI										
	0645	1428	DURN										
	1133	2121	SGMR										
	1345	2340	HARV										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

NOVEMBER 1977

NOV 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
10	2154	2400	MANI										
11	0000	0909	MANI										
	0648	1528	DURN										
	1134	2120	SGMR										
	1345	2340	HARV										
	2155	2400	MANI										
12	0000	0905	MANI										
	0652	1529	DURN										
	1135	2119	SGMR										
	1345	2340	HARV										
	2154	2400	MANI										
13	0000	0022	MANI										
	0100	0638	MANI										
	0707	0907	MANI										
	0652	1525	DURN	1023.3	1023.3	3	1023.3	1023.3	3				III
	1137	2118	SGMR										
	1345	2340	HARV				1608	1612	3	1608	1609	3	IIIG,V
14	0653	1525	DURN										
	1138	2117	SGMR										
	1345	2340	HARV										
	2300	2400	MANI										
15	0000	0907	MANI										
	0655	1525	DURN				0655 E	0710					IW
	1139	2116	SGMR										
	1345	2340	HARV										
	2156	2400	MANI										
16	0000	0909	MANI										
	0656	1457	DURN				0705.1	0705.3	3				IIIG
	0900	1334	DWIN				0900	1334	1				IS
			DWIN				1133.0	1133.5	2				IIIG
			DWIN				1159.3		2				IIIB
	1140	2115	SGMR							1222.9	1223.3	1	IIIG
			SGMR							1336.0	1337.0	1	IIIG
	1345	2340	HARV				1630		3	1630		3	IIIG,V
			SGMR							1757.2	1757.7	1	III
			HARV				1757	1758	3	1757	1758	3	IIIG,V
			SGMR							1822.8	1823.3	1	III
			HARV				1823		3	1823		3	IIIB
	2156	2253	MANI							2225.0	2225.4	1	III
	2318	2400	MANI										
17	0000	0909	MANI										
	0900	1148	DWIN				0900	1148	1				IC
	1142	2114	SGMR										
	0700	1524	DURN				1229.2	1235.8	1				I,N
	1345	2340	HARV				1348	2332	1				I
			DURN				1514.0	1524 D	1				I,C,DC,N
			HARV				1623	2100	2	1630	2100	2	IIIN
	2157	2400	MANI										
18	0000	0909	MANI										
	0700	1523	DURN				0700 E	1523 D	2				IC,DC,N
	0846	0920	DWIN				0846	0920	1				IS
	1033	1147	DWIN				1033	1147	1				IS
	1143	2114	SGMR										
	1345	2340	HARV				1349	1650	1				IN
	2157	2400	MANI										
19	0000	0908	MANI										
	0701	1523	DURN										
	1144	2113	SGMR										
	1345	2340	HARV										
	2157	2400	MANI										
20	0000	0908	MANI							0304.0	0304.2	1	III

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

NOVEMBER 1977

NOV 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
20			MANI							0618.3	0618.7	1	III
	0701	1523	OURN										
	1145	2112	SGMR										
	1345	2340	HARV										
	2158	2400	MANI										
21	0000	0908	MANI										
	0701	1522	OURN										
	1147	2111	SGMR										
	1345	2340	HARV										
	2159	2400	MANI										
22	0000	0908	MANI										
	0702	1505	OURN	1001.9	1102.1	3	1001.8	1102.1	3				IV, N
			OWIN				1121.5	1122.7	2				IIIG
	1136	1328	OWIN				1136	1142	2				IV
	1148	2111	SGMR							1231.0	1232.3	1	IIIG
	1345	2340	HARV										
	2200	2400	MANI										
23	0000	0910	MANI										
	0702	1522	OURN										
	1149	2110	SGMR										
	1034	1451	OWIN				1323.0	1324.2	2				IIIG
	1345	2340	HARV										
	2200	2400	MANI										
24	0000	0911	MANI										
	0702	1522	OURN										
	1150	2109	SGMR										
	1345	2340	HARV										
	2201	2400	MANI										
25	0000	0908	MANI										
	0703	1521	OURN										
	1400	2340	HARV										
	1151	2109	SGMP							1948.8	1950.2	1	IIIG
	2202	2400	MANI										
26	0000	0908	MANI										
	0703	1521	OURN										
	1153	2108	SGMR										
	1400	2340	HARV										
	2202	2400	MANI										
27	0000	0908	MANI										
	0703	1521	OURN										
	1154	2108	SGMR										
	1400	2340	HARV										
	2202	2400	MANI										
28	0000	0908	MANI										
	0703	1505	OURN										
	1155	2107	SGMR										
	1400	2340	HARV										
	2202	2400	MANI										
29	0000	0908	MANI										
	0704	1521	OURN										
	1156	2107	SGMR										
	1400	2340	HARV				1737	1738	2	1737	1738	2	IIIG
	2204	2400	MANI										
30	0000	0908	MANI										
	0706	1520	OURN										
	0850	1115	OWIN										
	1157	2106	SGMR							1754.0	1754.4	1	IIIG
	1400	2340	HARV				1754		3	1754		3	IIIB,V
			HARV				1831		1				IIIG
			SGMR							1904.1	1904.4	1	IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

NOVEMBER 1977

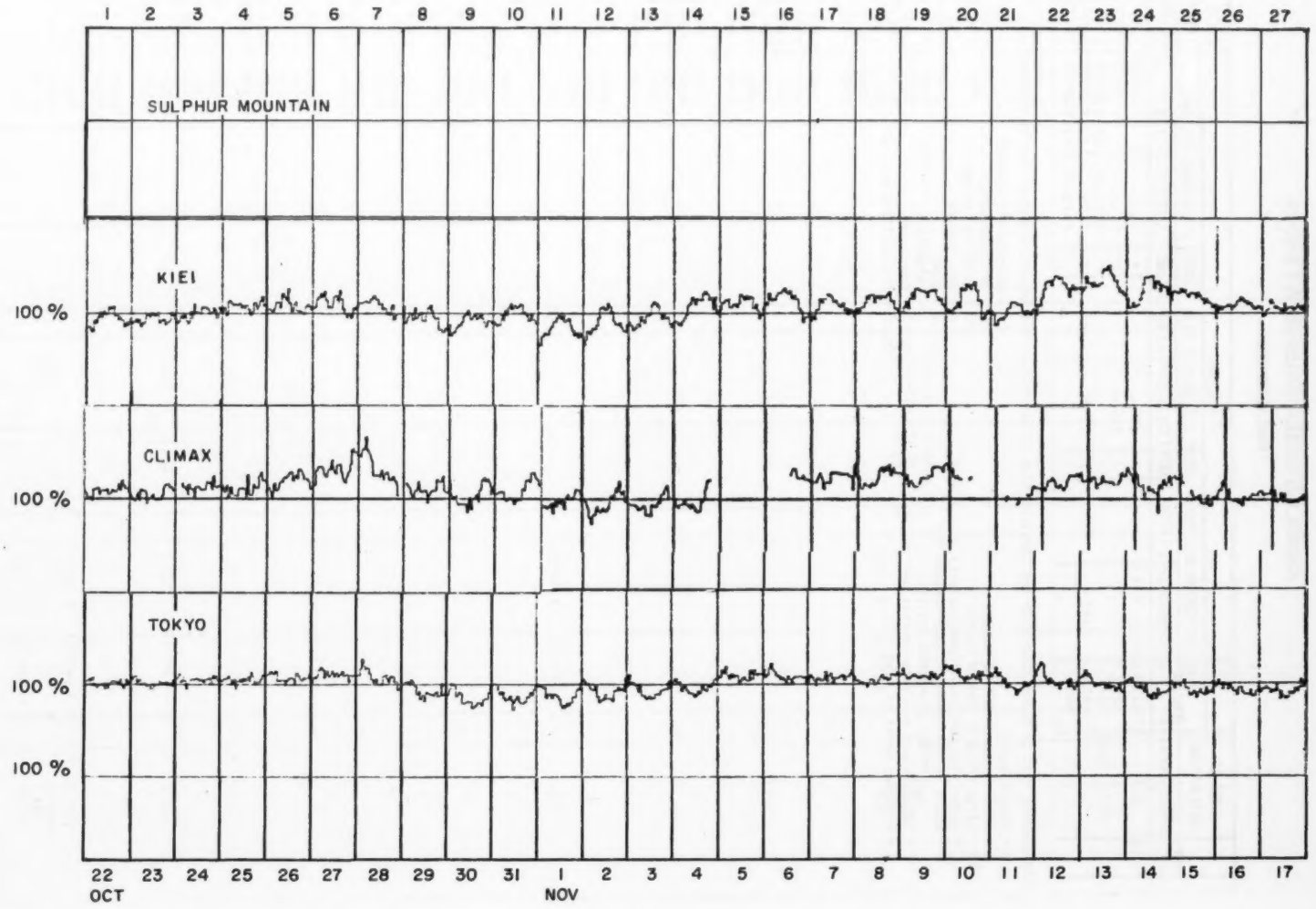
NOV 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
30			HARV				1904		3	1904		3	IIIG,V
			HARV				2144		2	2144		2	IIIG
	2204	2400	MANI							2311.6	2311.9	3	III
			HARV	2311		3	2309	2315	3	2309	2315	3	IIIGG,V
			MANI							2312.0	2312.3	3	III

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III
RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1972 (October - November 1977)

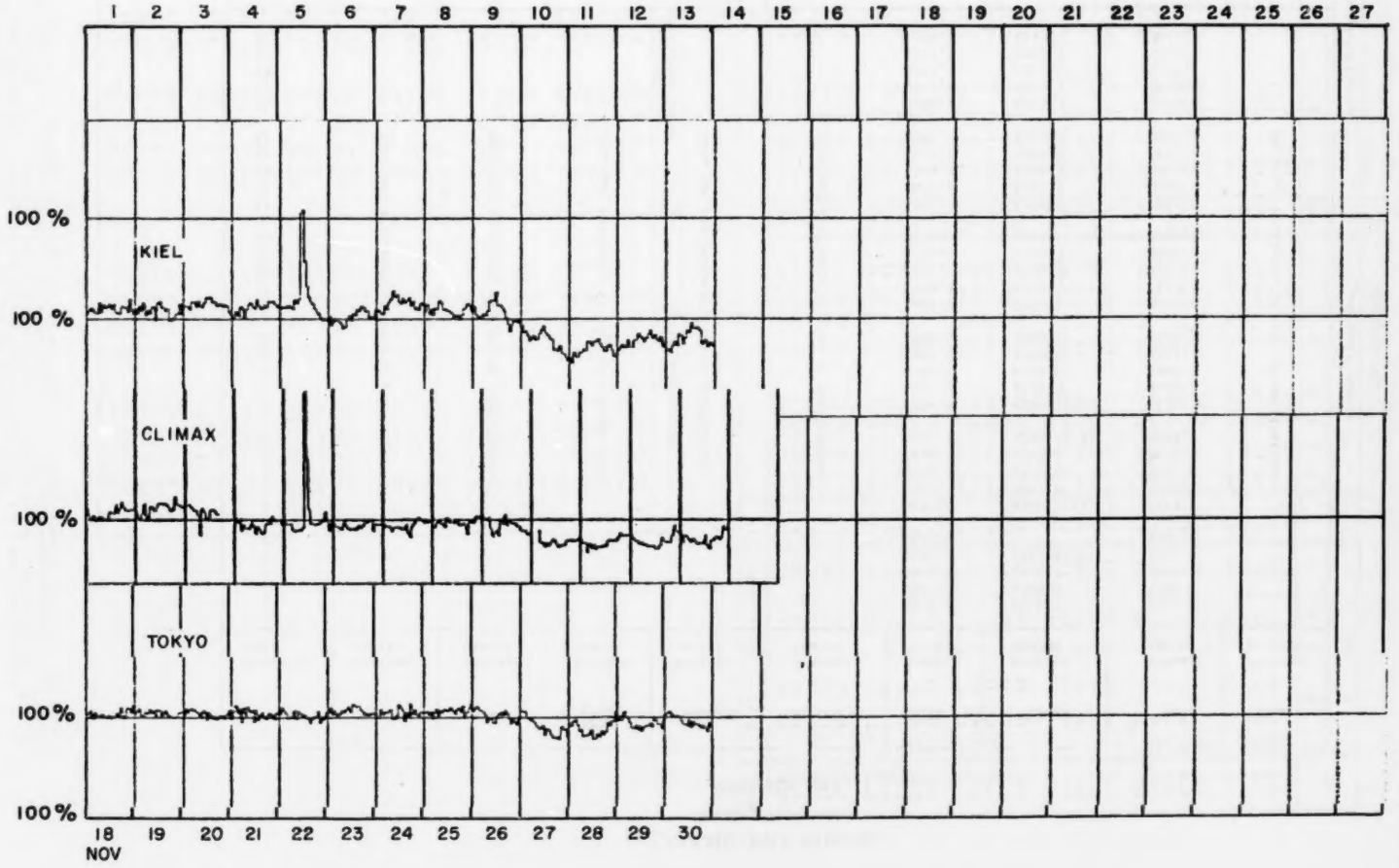


OCT

NOV

COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1973 (November 1977)



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Nov 77

COSMIC RAY INDICES
(Neutron Monitors)
NOVEMBER 1977

November 1977	THULE Average cts/hr	ALERT Average cts/hr	DEEP RIVER Average cts/hr	CALGARY Average cts/hr	SULPHUR MT Average cts/hr	KIEL Average cts/hr	CLIMAX Average cts/hr	TOKYO Average cts/hr	KULA Average cts/hr
1						6328.6	4266.5	3643.0	
2						6348.9	4260.4	3650.0	
3						6363.9	4261.7	3652.3	
4						6402.0	4267.8(38)	3657.8	
5						6413.0		3680.8	
6						6423.0	4350.7(24)	3679.5	
7						6403.7	4347.8	3676.3	
8						6421.0	4349.4	3672.0	
9						6434.4	4353.6	3678.8	
10						6422.1	4352.3(18)	3682.5	
11						6384.9	4290.5(28)	3665.5	
12						6465.8	4334.3	3669.9	
13						6484.6	4338.0	3663.1	
14						6457.2	4320.2	3651.7	
15						6434.5	4290.3	3652.3	
16						6407.7	4284.6	3652.0	
17						6398.9	4278.0	3649.3	
18						6394.7	4296.0	3662.7	
19						6388.5	4311.5	3663.5	
20						6408.9	4296.4(34)	3662.2	
21						6398.9	4258.6	3663.0	
22						6430.2	4287.2	3659.5	
23						6369.3	4256.7	3667.9	
24						6411.6	4258.5	3664.6	
25						6391.0	4265.4	3667.8	
26						6380.7	4254.3	3659.0	
27						6293.2	4203.1	3638.6	
28						6264.3	4202.0	3634.1	
29						6291.7	4202.9	3644.5	
30						6296.7	4213.7	3647.3	
MEAN						6390.5	4282.0	3660.4	

Data not available at time of publication.

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Notes: Tokyo neutron monitor counting rate increased by 2.0/1.5 since the beginning of September 1977. The number of counters changed from 27 to 36. Since the scaling factor has been changed, the listed figures are nearly the same as those in and before May 1977. The level in June, July, and August, 1977 is slightly lower than before. The level in September 1977 has been adjusted, so that direct comparison with the data in and before May, 1977 is possible.

Thule, Alert, Calgary, Sulphur Mountain, Kiel, Climax and Kula Scaling Factors = 100. Deep River Scaling Factor = 300. Tokyo Scaling Factor = 256.

Kula data are available on magnetic tape from the World Data Center A for Solar-Terrestrial Physics. These data include the periods July 1967-December 1970 and October 1975 to the present.

GEOMAGNETIC ACTIVITY INDICES

NOVEMBER 1977

Day		Three-Hourly Indices Kp 1	2	3	4	5	6	7	8	Sum	Three-Hourly Indices Km 1	2	3	4	5	6	7	8	Ap	aa * N	S	M			Cp
1	Q8	1+	0+	1+	1	1	1-	1+	2+	9+	1	1-	1+	1	2-	1	1+	2-	5	9	8	7	10	CC	0.2
2		2+	1+	1	1	1	1	2+	1+	11+	2	1-	1	1	1+	1+	2	2-	6	12	8	10	11	CC	0.2
3	Q6	0+	2-	1	1	0+	1+	1	0+	7	1-	1+	1	1	1-	2-	1+	0+	4	4	11	8	8	CC	0.1
4		1+	0+	0+	1	2	4-	3-	2+	14-	1	0+	1	1	2	4-	2+	2	8	14	12	7	21	K	0.4
5		4+	3-	2	2-	1	2	1	2-	16+	3+	2	1+	2-	2-	2+	1+	2-	10	19	12	18	13		0.5
6		2+	1+	2	2	2+	2+	1+	1-	14+	2-	1-	2-	2-	2+	2	1	1	7	14	10	13	11	CC	0.3
7		2-	2	1+	2-	2	1	0+	1+	11+	2-	1+	2-	2-	2+	1+	1	1+	5	8	10	9	10	CC	0.2
8	Q4	1-	1-	1+	1-	1	1-	2-	0	7-	1-	1-	1+	1+	1+	1+	2	1-	3	5	8	6	8	CC	0.1
9	Q3	1	2-	1-	1-	0+	1-	1	0	6	1	1+	1	0+	1-	1+	1+	0	3	4	6	7	4	CC	0.1
10		0+	0+	2-	1+	3	3+	2	3	15	0+	0+	2-	1+	3	3+	2+	3	9	14	22	7	30		0.5
11		2+	1+	1+	2-	2	1+	1+	2-	13	2	1+	1+	1+	2	1+	1+	2	6	14	15	15	14		0.3
12	D5*	3+	4+	3+	3+	3-	3	3-	4-	26+	3-	3	3	3	3-	3+	3-	3+	18	31	34	34	31		1.0
13	D3	4	4+	3+	4	4	5	3	3+	31	3+	3+	2+	4-	4+	5-	3-	3+	26	55	32	38	50		1.2
14	D1	4	4+	5	4+	5	5	4+	6-	38-	3+	4-	4	4+	5-	5-	4	5	42	71	37	43	65		1.5
15	D2	6-	3+	3	5-	3+	4-	2+	3	29	5	3-	2	4-	3+	3	3-	3	25	44	28	48	24		1.2
16		4-	3-	3	3	3+	3	3-	2	23+	3+	2	3-	3	3+	3-	3-	2-	14	27	25	25	27		0.8
17		3-	3-	2-	2+	0+	0+	1-	3+	14	2	2	2-	2	1-	0+	1-	3-	8	18	10	16	12		0.4
18		1+	3-	2-	2	2	1+	1+	1+	14-	1+	2	1+	2-	2+	1+	1	1+	6	12	9	11	10	CK	0.3
19		2	2+	2-	1+	1	1+	2	2+	14	1+	1+	1	2	1+	2-	2+	2	6	16	10	10	16	KC	0.3
20	Q7	2-	1+	1-	1	1-	1	1	1	8+	1+	1+	1-	1+	1	1	1+	1+	4	8	9	9	8	CK	0.1
21	Q9K	3	1+	1-	1-	1	1-	1-	1	9	2+	1	1	1	1	1	1	1	5	7	11	12	7	CC	0.2
22	Q5	1-	1+	1	2	0+	0+	0+	0+	6+	1	1+	1+	2-	0+	0+	0+	1	3	5	8	9	4	CC	0.1
23	Q2	1-	1-	0	0+	1-	1-	0+	1	4+	1-	1	0+	0+	1	1-	1-	1	2	4	6	4	7	CC	0.0
24	Q1	0+	0+	1-	1	0+	1-	0	0+	4-	0+	0+	1	1	0+	1+	0	0+	2	4	5	6	3	CC	0.0
25		1-	0+	0+	1	3	3-	4+	5	17+	0+	1-	1-	1	3+	3	4+	5-	15	28	21	6	43		0.8
26	D4*	5+	3+	2	3+	3	3	2	3	25	4	3-	2-	3	3-	3+	2+	3	19	35	24	35	25		1.0
27		5	2+	3-	2	2-	1+	2-	1+	18	4-	2+	2+	2	2-	1+	2	1+	12	23	19	32	11		0.7
28	Q0	2-	2+	2-	2-	1-	1	1-	1+	11	1+	2-	1+	1+	1+	1	1	1+	5	9	13	14	9	CC	0.2
29		2+	2	1	1	1+	1	2	2+	13	2-	1+	1	1+	2	2-	2-	2	6	16	17	13	21		0.3
30		2+	3	4-	3+	2+	1+	2-	2+	20	2+	3	4-	3	3-	2-	2	2-	12	23	30	35	18		0.7
																			10	18.6	15.6	17.2			0.46

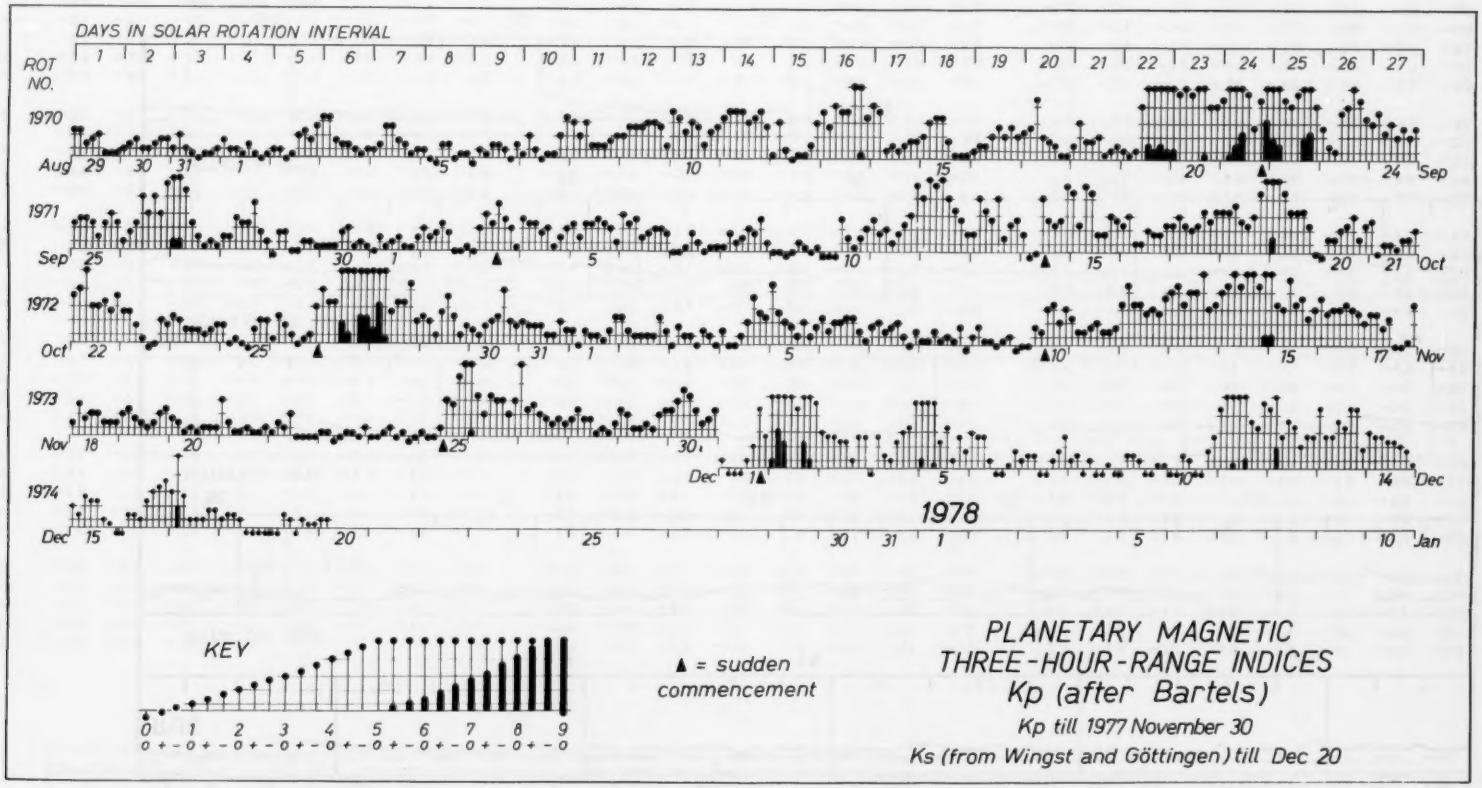
Day	Three-Hourly Indices Kn 1	2	3	4	5	6	7	8	Three-Hourly Indices Ks 1	2	3	4	5	6	7	8
1	1	0+	1+	1	1+	1-	1+	2	1	1-	1	1-	2-	1	1+	2-
2	2-	0+	1	1	1+	1+	2	1+	2+	1	1	1	1+	1	2	2-
3	0+	1	1	1	0+	1+	1+	0+	1	2-	1+	1-	1	2-	2-	0+
4	1-	0+	1-	1	2	4-	2+	2	1	1-	1+	1+	2+	3+	2	2+
5	3+	2	2-	2	1+	2+	2-	2-	3	2	1-	1+	2-	2	1+	2-
6	2	1	2	2+	3-	2+	1	1-	1+	1-	1+	1+	2-	2	1+	1+
7	1+	1+	2	2-	2+	1+	1-	1+	2-	1+	1	2-	2+	1+	1	1
8	0+	0+	2-	1+	2-	1	2	0	1	1	1	1+	1+	1+	2	1
9	1-	1+	1	0+	1	1+	2-	0	1	1+	1	1-	1-	1	1+	0+
10	0	0+	2	1+	3-	3+	2	3-	1-	0+	2-	1+	4-	4-	3-	3+
11	2	1	1	1+	2-	1+	1+	2-	2	1+	2-	1+	2	1+	1+	2
12	3	3+	3	3+	3-	3+	3-	3	2+	3	3	3-	2+	3+	3-	3+
13	3+	4-	2+	4-	5-	5	3-	3	3+	3	2+	3+	4	4+	3	3+
14	3	4-	4+	4	5-	5	4	5	4-	3+	4-	4+	5-	4+	4	5
15	5-	3-	2	4	3+	3	3-	3	5+	3-	2-	4-	3+	3	3-	3
16	3	2	3-	3+	3+	3-	3-	1+	4-	2+	3-	3-	3+	3-	2+	2
17	2	2+	2-	2	1-	0+	0+	3	2-	2-	2-	2	1-	0+	1	3-
18	1	2-	2-	2	2+	2-	1	1	1+	2	1	1+	2	1+	1	1+
19	1+	2-	1+	2-	1	1+	2+	2	1+	1	1	2	1+	2	2+	2
20	1	1+	1-	1	1-	1-	1+	1+	1+	1+	1	1+	1+	1	2-	1+
21	2+	1	1	1-	1	1	1-	1	3-	1+	1	1	1+	1	1	1+
22	1-	1	1+	1+	0	0	0	0+	1+	1+	2-	2+	1-	0+	1	1+
23	0	1-	0	0+	1-	1-	0+	1-	1	1+	1-	0+	1	1	1	1
24	0	0	1-	1	0+	1	0	0	1-	1-	1	1	0+	1+	0	1-
25	0	0	0	1	3+	3-	4	5-	1-	1	1	1-	4-	3+	5-	5
26	4	3-	2	3+	3-	3	2	3-	4-	3-	2-	2	3-	4-	2+	3
27	4-	2-	2	2	1+	1+	2-	1	4	2+	2+	2+	2	1+	2+	2-
28	1	2-	2-	1+	1	1	1	1	2-	2	1+	2-	1+	1	1	1+
29	1+	1	1-	1	2	2-	2-	2	2-	2-	1+	1+	2	2-	2	2+
30	2-	3-	4-	3	2+	1+	2-	2-	3	3+	4-	3+	3-	2-	2	2

Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days [Q1-Q0(10)] and five most disturbed days [D1-D5] are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap ≤6 but one Kp ≥3o or two Kp values ≥3-"). An * means "not really disturbed" (Ap<20).
Georagnetic three-hourly indices (Kn), (Ks) and (Km) as in IAGA-Bulletin No. 32 and indices (aa), "antipodal", as in IAGA-Bulletin No. 33 prepared by P. N. Mayaud of the Institut de Physique du Globe, Paris, France. Really quiet (C) and quiet but slightly disturbed three-hourly intervals (K) are given for 24-hour and 48-hour intervals centered on 12 UT.

DAILY AVERAGE INDICES Ap

	1976	1977										
DAY	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
1	7	17	7	11	4	13	9	15	6	4	4	5
2	3	5	21	5	5	66	14	11	4	6	5	6
3	4	6	11	4	12	15	6	9	7	8	10	4
4	15	10	4	3	24	19	5	8	9	6	7	8
5	6	15	9	4	12	11	7	5	40	3	8	10
6	3	10	14	6	49	10	5	28	21	4	8	7
7	10	7	18	5	48	6	6	15	17	6	3	5
8	23	6	18	12	27	3	6	14	12	8	6	3
9	16	6	25	38	22	7	6	16	20	11	2	3
10	13	3	12	19	13	9	8	14	12	13	4	9
11	13	14	13	18	14	24	4	10	28	19	12	6
12	15	12	7	22	8	19	4	4	11	6	28	18
13	8	7	12	13	5	6	6	9	11	28	14	26
14	4	18	11	12	12	8	9	18	12	10	13	42
15	2	13	8	5	10	14	3	12	11	9	19	25
16	8	7	6	6	17	22	10	27	9	7	8	14
17	10	6	9	9	9	18	8	14	29	10	12	8
18	28	10	17	11	8	11	10	7	13	6	22	6
19	7	8	6	5	48	5	10	23	24	42	28	6
20	5	12	5	13	28	10	11	29	8	44	7	4
21	4	5	7	10	12	4	6	10	5	64	5	5
22	8	7	8	7	6	7	10	11	5	63	22	3
23	5	6	18	14	5	7	10	6	6	21	6	2
24	6	8	14	12	11	8	7	7	10	12	6	2
25	9	9	11	12	22	5	5	5	27	10	4	15
26	6	4	8	16	4	2	6	3	13	18	6	19
27	6	4	3	8	4	4	7	3	14	24	62	12
28	6	13	7	15	4	7	12	4	7	9	47	5
29	45	15		14	18	2	7	61	6	3	9	6
30	13	30		5	8	5	9	17	5	4	9	12
31	12	19		4		7		8	4		6	
MEAN	10	10	11	11	16	11	8	14	13	16	13	10

GEOMAGNETIC ACTIVITY INDICES

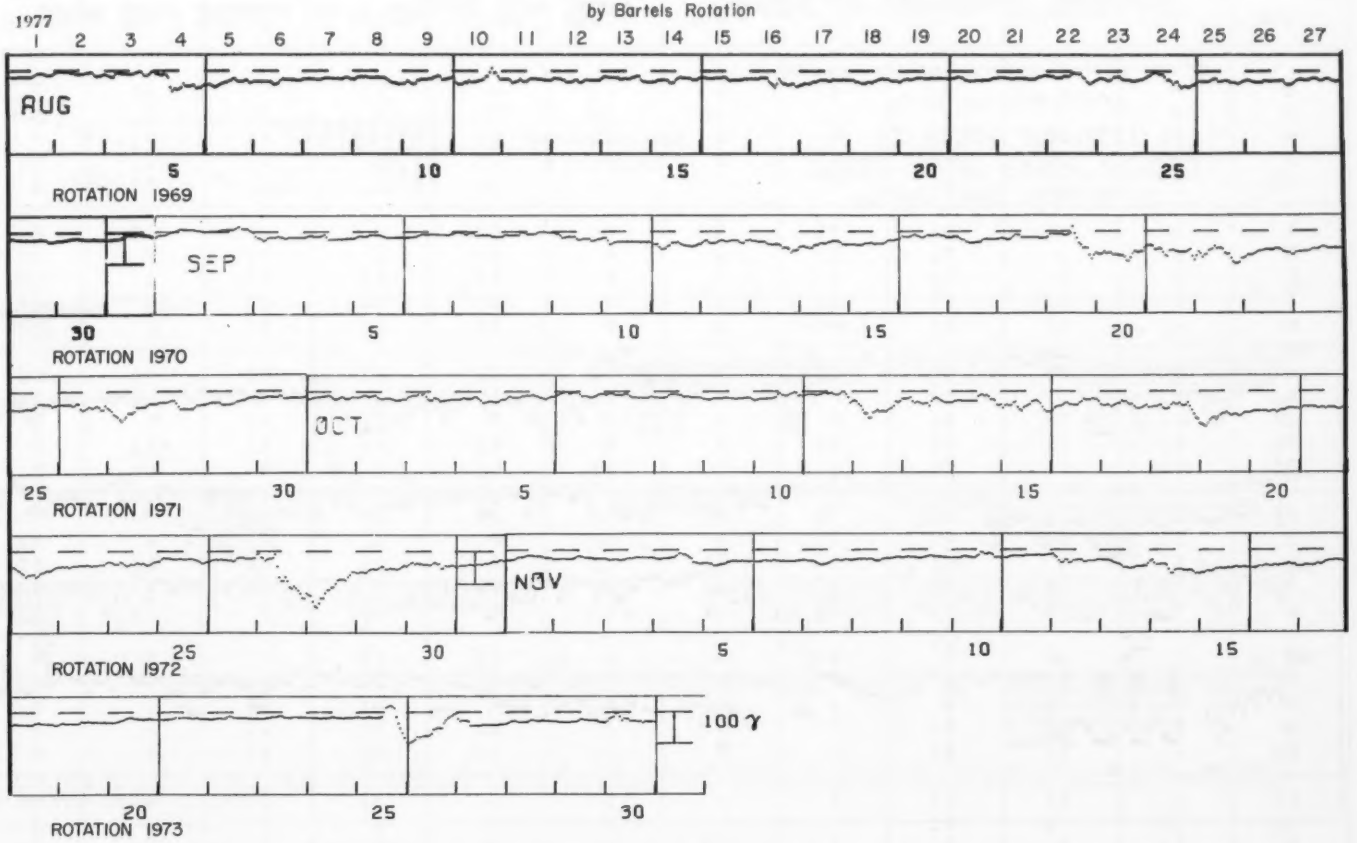


With Best Wishes for a Happy New Year *Institut für Geophysik Göttingen*

GEOMAGNETIC ACTIVITY INDICES

Hourly Equatorial Dst

by Bartels Rotation



Note the sensitivity indicator for each month on the last day of the month and also note that the zero reference level is different for each month.

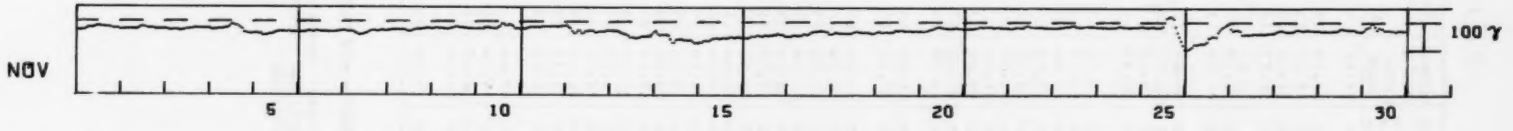
HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

NASA/GODDARD SPACE FLIGHT CENTER

NOVEMBER 1977

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-34	-36	-34	-31	-29	-26	-21	-23	-22	-20	-17	-16	-16	-20	-22	-22	-20	-21	-24	-27	-28	-28	-29	-32
2	-31	-29	-29	-28	-28	-30	-30	-27	-27	-23	-18	-17	-21	-24	-27	-27	-26	-27	-30	-30	-30	-28	-29	-28
3	-31	-33	-35	-33	-30	-30	-33	-36	-33	-31	-28	-26	-26	-25	-24	-22	-22	-24	-27	-26	-25	-25	-26	-27
4	-31	-32	-30	-27	-26	-26	-26	-23	-22	-21	-16	-11	-9	-15	-16	-20	-26	-30	-38	-42	-44	-46	-45	-41
5	-41	-42	-46	-46	-52	-49	-48	-45	-43	-42	-41	-37	-36	-33	-34	-34	-35	-35	-33	-36	-36	-36	-37	-39
6	-37	-37	-38	-36	-33	-32	-36	-37	-35	-31	-34	-35	-35	-35	-37	-37	-38	-37	-35	-36	-34	-33	-32	-31
7	-31	-36	-37	-36	-37	-39	-44	-47	-49	-49	-45	-42	-39	-36	-32	-31	-30	-33	-33	-31	-29	-30	-31	-31
8	-30	-29	-28	-28	-28	-28	-29	-27	-28	-31	-36	-36	-33	-29	-27	-26	-26	-26	-25	-24	-22	-21	-23	-24
9	-23	-22	-21	-23	-23	-23	-25	-26	-26	-23	-22	-20	-18	-18	-20	-21	-21	-22	-24	-25	-25	-25	-25	-24
10	-24	-24	-25	-24	-21	-19	-21	-25	-26	-28	-24	-19	-15	-7	-10	-15	-17	-10	-15	-18	-27	-26	-27	-29
11	-27	-26	-25	-21	-19	-18	-19	-20	-20	-23	-19	-16	-19	-16	-17	-18	-16	-15	-18	-17	-16	-15	-13	-13
12	-12	-20	-27	-37	-42	-40	-30	-35	-43	-38	-33	-32	-30	-30	-33	-40	-38	-34	-34	-37	-35	-31	-29	-30
13	-30	-33	-32	-33	-37	-41	-43	-46	-47	-51	-57	-56	-58	-61	-57	-55	-51	-51	-50	-50	-48	-48	-41	-35
14	-31	-43	-49	-47	-46	-45	-43	-51	-63	-75	-75	-62	-59	-59	-60	-65	-63	-66	-62	-64	-71	-76	-72	-76
15	-70	-70	-65	-63	-68	-66	-61	-57	-57	-55	-57	-57	-56	-54	-57	-55	-53	-50	-55	-55	-52	-51	-54	-56
16	-58	-58	-55	-52	-48	-50	-48	-45	-47	-48	-49	-45	-46	-47	-45	-45	-43	-43	-39	-42	-45	-46	-51	-52
17	-52	-48	-45	-46	-46	-47	-48	-45	-40	-41	-44	-40	-36	-34	-32	-32	-31	-30	-30	-31	-32	-37	-43	-42
18	-39	-36	-37	-40	-41	-41	-42	-42	-40	-42	-40	-35	-34	-32	-34	-35	-36	-37	-35	-37	-39	-42	-41	-37
19	-34	-32	-35	-36	-34	-34	-35	-37	-35	-33	-28	-30	-30	-28	-29	-31	-30	-30	-30	-31	-32	-29	-34	-31
20	-31	-33	-31	-30	-28	-25	-24	-21	-18	-16	-16	-18	-21	-23	-25	-24	-22	-21	-21	-19	-21	-23	-25	-26
21	-22	-22	-24	-22	-22	-20	-20	-18	-15	-17	-17	-16	-16	-16	-16	-19	-19	-17	-17	-19	-21	-20	-19	-20
22	-23	-23	-20	-18	-17	-17	-15	-18	-15	-12	-12	-15	-16	-17	-17	-16	-17	-18	-19	-18	-19	-19	-20	-19
23	-19	-19	-19	-17	-17	-16	-14	-14	-14	-12	-11	-12	-15	-17	-17	-16	-15	-14	-14	-15	-14	-15	-15	-16
24	-17	-16	-17	-15	-21	-21	-18	-17	-17	-18	-16	-13	-14	-15	-17	-18	-21	-15	-16	-16	-16	-16	-15	-14
25	-14	-16	-18	-18	-16	-14	-16	-17	-19	-19	-16	-13	0	14	17	20	16	10	-18	-38	-53	-67	-82	-96
26	-98	-92	-89	-84	-76	-76	-74	-72	-71	-72	-70	-65	-55	-50	-47	-51	-50	-33	-25	-18	-14	-11	-6	-4
27	-25	-31	-26	-27	-30	-33	-43	-42	-41	-42	-42	-40	-38	-40	-40	-42	-41	-40	-40	-39	-37	-37	-38	-36
28	-33	-29	-27	-26	-30	-34	-33	-33	-33	-31	-28	-24	-24	-26	-29	-30	-26	-25	-27	-27	-27	-28	-31	-32
29	-33	-34	-30	-30	-32	-31	-31	-29	-29	-29	-26	-21	-21	-23	-23	-26	-25	-25	-25	-29	-32	-34	-35	-31
30	-26	-19	-15	-13	-4	-2	-17	-29	-18	-23	-24	-31	-28	-31	-31	-33	-33	-37	-30	-30	-33	-34	-32	-29



PRINCIPAL MAGNETIC STORMS

NOVEMBER 1977

OBS. 2 letter IAGA code	GEOMAG-NETIC LATI-TUDE	COMMENCEMENT DAY	hr min (UT)	TYPE	SC - AMPLITUDES D(')	H(y)	Z(y)	MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD)	K	RANGES D(')	H(y)	Z(y)	UT END DAY	HOUR
HU	00.6S	4	1113	..	..	..	..	04(6)	5	6	217	23	04	21
SI	60.0N	10	07--	..	..	..	..	14(4)	6	50	430	440	16	15
HD	07.6N	10	1307	SC	0	+10	- 1	10(5,6)	4	3	99	11	11	16
HU	00.6S	10	1309	SC	1	38	2	10(5,6)	5	4	244	22	10	24
KG	56.5S	10	1308	SC	--	--	--	10(8)	4	--	--	--	11	09
NE	55.1N	11	23--	..	..	..	..	13(4) 14(2,3,5)	5	40	124	155	17	12
HD	07.6N	11	2300	..	..	..	..	13(5)	5	4	133	18	13	21
CO	64.6N	12	03--	..	..	..	..	14(4) 15(4)	7	332	1600	1030	16	15
WI	54.2N	12	23--	..	..	..	..	13(6) 14(6,7,8) 15(1)	6	35	190	100	15	20
FR	49.6N	12	00--	..	..	..	..	14(8)	6	28	123	44	17	13
BD	48.9N	12	01--	..	..	..	..	14(5)	5	29	107	60	16	22
TU	40.4N	13	22--	..	..	..	..	14(2,5,6,8) 15(1)	5	14	110	25	15	20
GM	24.5N	13	0100	..	..	..	..			11	101	36	15	18
JP	17.3N	13	0100	..	..	..	..			8	111	23	15	18
SH	14.6N	13	0100	..	..	..	..			6	107	35	15	18
UJ	13.5N	13	0100	..	..	..	..			6	102	19	15	18
AL	09.5N	13	0100	..	..	..	..	14(3,6)	5	5	104	23	15	18
AN	01.5N	13	0100	..	..	..	..			5	128	70	15	18
HU	00.6S	13	2256	SC	1	7	1	14(5,6)	5	8	178	29	15	01
TV	01.1S	13	0100	..	..	..	..			4	154	90	15	18
HR	33.7S	13	15--	..	..	..	..	14(8)	6	20	100	106	15	18
IR	41.0N	14	0200	..	..	..	..	14(3)	6	30	94	33	15	20
HD	07.6N	14	0300	..	..	..	..	14(6)	5	5	103	15	15	19
WI	54.2N	25	1226	SC	- 1	+26	0	26(1)	6	25	125	40	26	04
FR	49.6N	25	12--	..	..	..	..	25(8)	5	20	116	70	27	13
BD	48.9N	25	1225	SC	- 1	+23	- 1	25(8)	5	16	145	47	27	08
IR	41.0N	25	1227	SC	- 2	48	6	25(8)	6	21	118	20	26	03
TU	40.4N	25	1225	SC	+ 1	+17	+ 1	25(8)	6	12	160	35	27	10
SJ	29.9N	25	1225	SC	+ 0.5	+05	+01	25(7,8)	5	10	178	38	26	05
GM	24.5N	25	1224	SC	- 1.0	34	- 3			8	123	19	27	02
HO	21.1N	25	1225	SC	00	06	02	26(1)	6	02	24	02	26	16
JP	17.3N	25	1224	SC	- 1.3	32	- 7			6	117	14	27	02
SH	14.5N	25	1224	SC	- 0.7	29	5			5	98	10	27	02
UJ	13.5N	25	1224	SC	- 0.9	36	- 8			5	134	18	27	02
AL	09.5N	25	1224	SC	- 1.0	26	- 8	25(7)	5	5	107	21	27	02
HD	07.6N	25	1224	SC	- 0.8	+32	- 1	25(8)	6	3	123	99	26	06
GU	04.0N	25	1225	SC	--	23	-06	25(8)	6	0	90	20	26	06
AN	01.5N	25	1224	SC	- 1.7	36	23			4	124	54	27	02
HU	00.6S	25	1227	SC	2	68	6	25(6)	6	7	319	22	26	02
TV	01.1S	25	1224	SC	--	32	35			4	125	72	27	02
HR	33.7S	25	1226	SC	+ 3	+12	+ 9	25(7)	6	20	114	115	26	03
KG	56.5S	25	1226	SC	--	--	--	25(8)	7	--	--	--	27	15
HD	07.6N	26	1712	SC	- 0.3	+25	- 2	26(6,8)	4	4	65	12	27	14
GU	04.0N	26	1714	SC	--	20	-04	27(1)	5	0	90	10	27	14
HU	00.6S	26	0415	SC	--	14	2	26(1,6)	5	8	166	35	27	24
KG	56.5S	26	1714	SC	--	--	--	27(1)	4	--	--	--	27	15
HD	07.6N	29	1300	..	..	..	..	30(2,3)	4	3	90	17	30	21

Reports were received from the following observatories:

Alibag Annamalainagar Boulder College Fredericksburg Gnangara Guam Gulmarg Hermanus Honolulu Huancayo Hyderabad Irkutsk Jaipur Kerguelen Newport San Juan Shillong Sitka Toolang Trivandrum Tucson Ujjain Witteveen

SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

NOVEMBER 1977

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romaná)

The meaning of the station symbols is given in the IAGA-Bulletin nr. 32.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc).

10 1309: B: WN KS HU; C: WI AE GN CZ KG DU
25 1227: A: SO DO FU HU KG DU; B: WN WI DB CF EB CI TL AE KA KS SZ GN; C: NI
26 1704: A: DO; B: SO WN DB CF EB CI AE KS LM GN CZ KG; C: NI BU TL DU (si: A: FU)

Solar-flare effects (sfe)

Effects confirmed by ionospheric or solar observations are underlined.

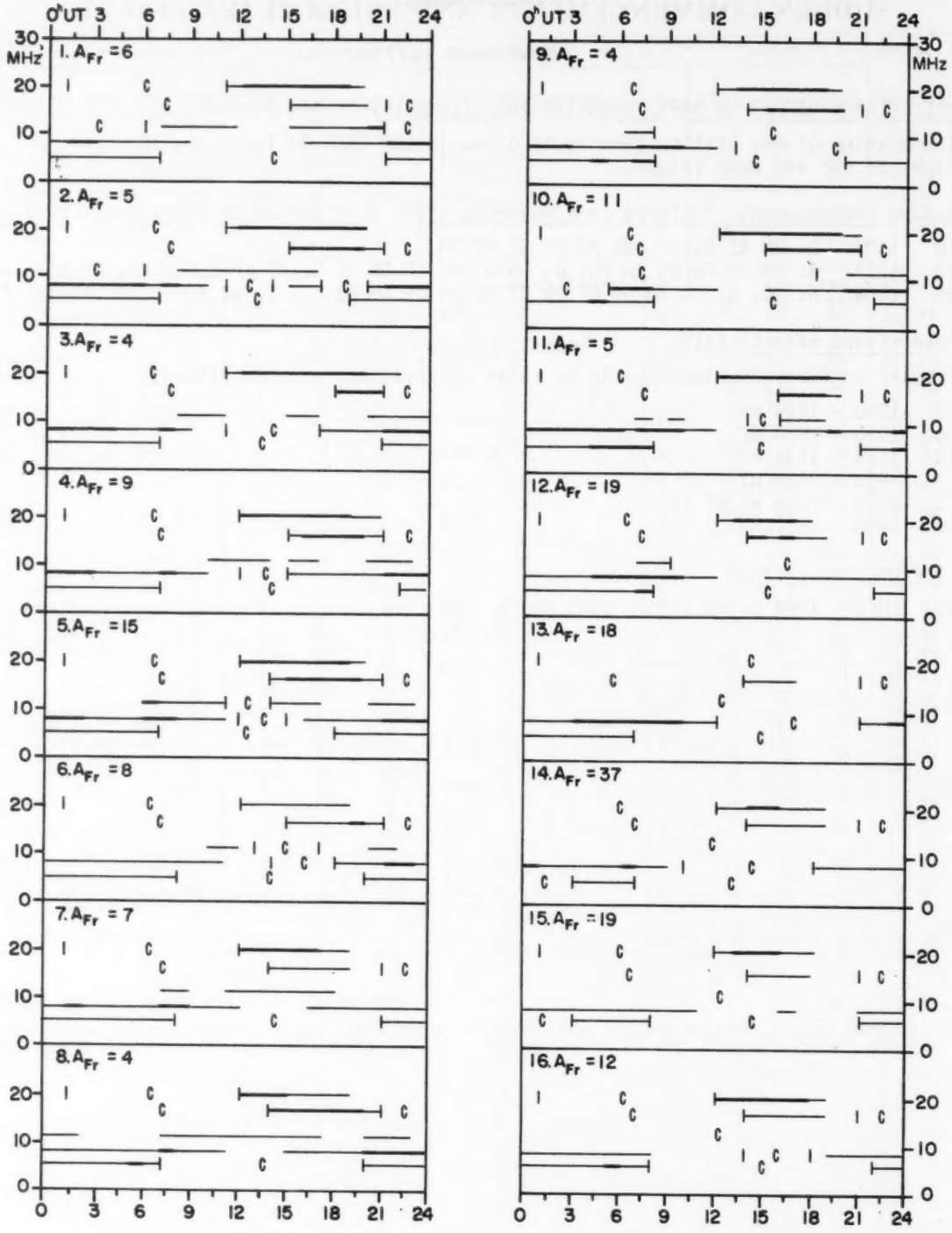
05 1340 - 1400 HU
06 1930 - 1950 AE
10 1115 - 1136 BU
17 0925 - 0939 NI
22 0959 - 1036 WI NI EB
30 1900 - 1917 HU

Very unusual events

25 1848 - 1908 pg WN (105s, 15γ) DB FU (25s, 1γ)

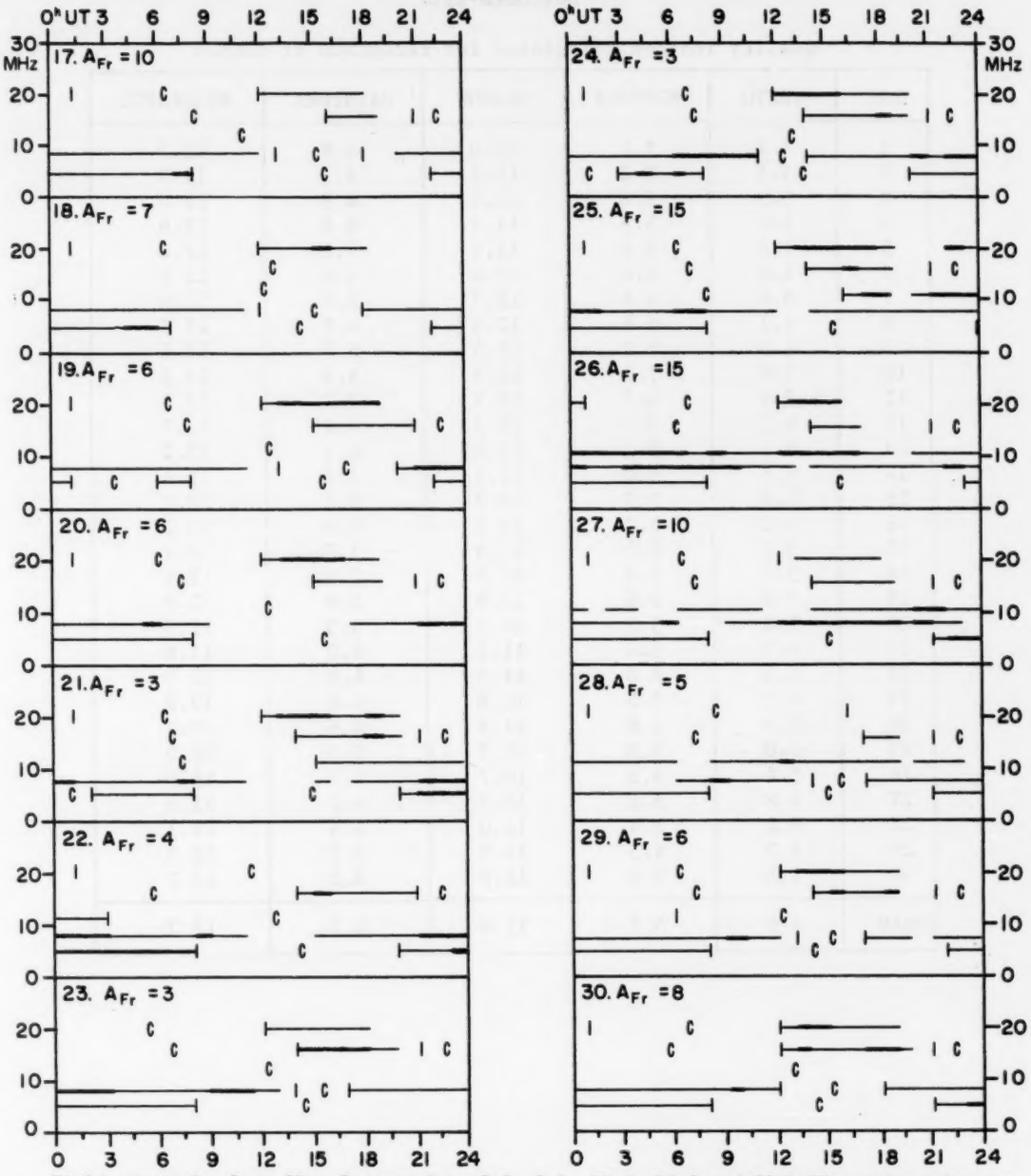
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

NOVEMBER 1977



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

NOVEMBER 1977



Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow - Norfolk circuit are represented above. Heavy solid lines represent field strengths ≥-12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line.

Adapted from Observations by Deutsche Bundespost

RADIO PROPAGATION QUALITY INDICES

NOVEMBER 1977

Quality indices calculated for reception at Lüchow

DAY	TOKYO	NORFOLK	MOSCOW	CANBERRA	BRACKNELL
1	5.2	5.1	12.0	3.9	12.7
2	5.5	6.1	12.2	4.3	12.3
3	5.0	5.8	12.6	4.9	12.6
4	5.0	5.8	11.7	4.8	12.6
5	5.4	6.4	11.4	4.1	12.2
6	4.9	5.0	12.6	4.0	12.6
7	5.4	4.6	12.7	5.0	12.6
8	4.7	6.4	12.4	4.5	12.7
9	4.0	6.7	12.5	5.0	12.8
10	5.0	7.2	12.3	5.3	12.8
11	5.4	6.7	12.9	3.7	12.5
12	4.7	5.2	12.3	4.4	12.5
13	5.4	5.3	11.8	4.1	12.2
14	4.5	5.0	11.1	3.2	11.4
15	2.8	5.8	10.7	3.3	12.2
16	3.2	6.2	11.2	3.4	12.2
17	3.3	5.5	11.5	3.5	12.2
18	3.3	5.3	11.6	3.4	12.4
19	3.8	5.6	11.9	3.6	12.0
20	5.0	5.8	10.9	3.3	11.5
21	4.5	5.4	11.8	4.0	11.6
22	4.5	5.6	11.3	4.0	12.0
23	4.1	5.5	11.8	4.4	12.2
24	3.9	5.8	11.8	4.6	12.2
25	6.0	5.8	11.7	5.3	11.9
26	5.4	5.3	10.7	4.7	11.4
27	4.8	5.8	10.7	4.7	11.5
28	4.2	5.4	11.0	4.6	11.1
29	4.0	6.5	11.9	3.8	11.8
30	4.5	5.6	11.8	3.5	12.2
MEAN	4.6	5.7	11.8	4.2	12.2

USCOMM-NOAA-ASHEVILLE,NC-2/3/78--950

P-A STACKS

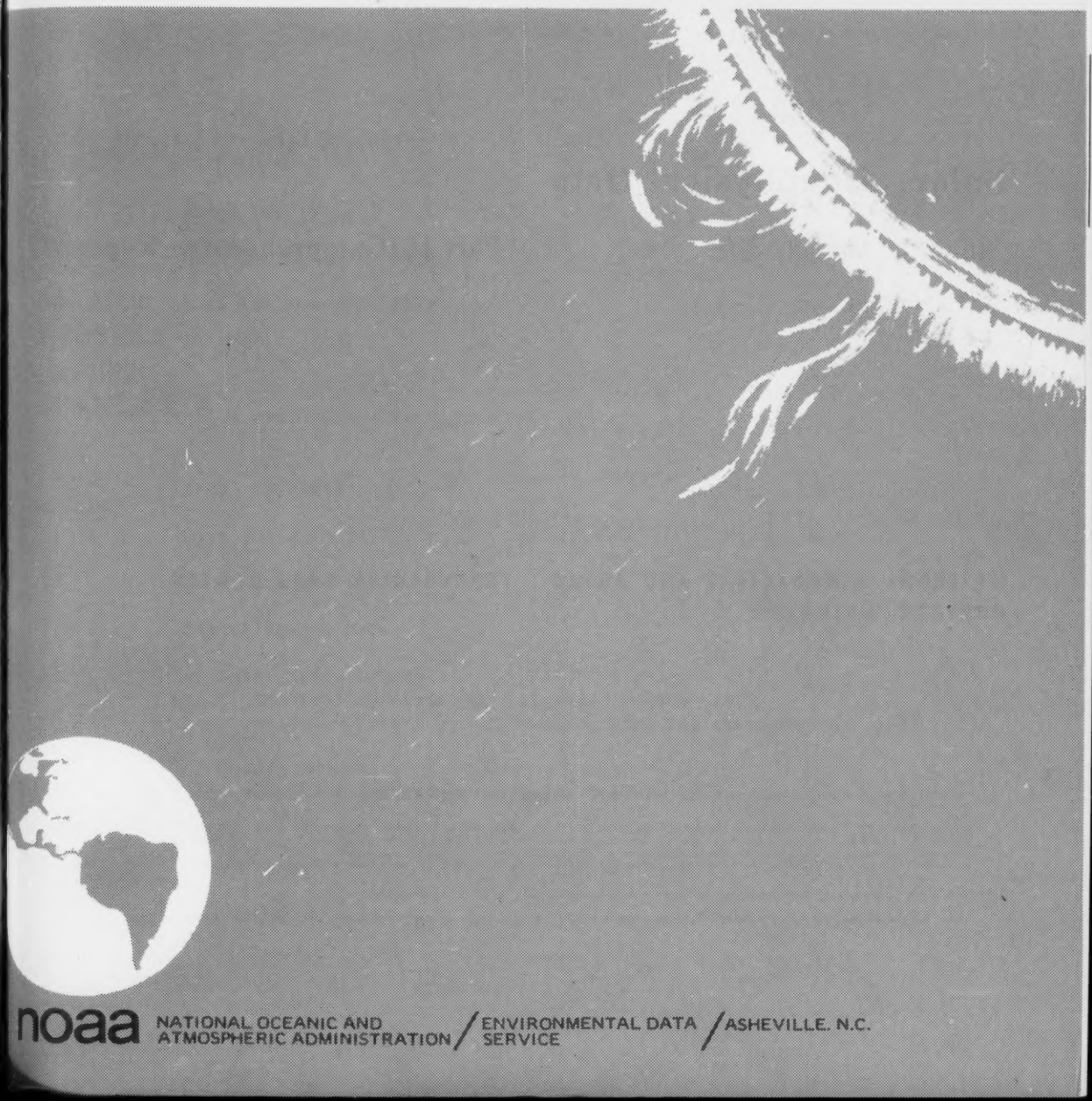
January 1978 Number 401-Part II

FEB 20 1978

Solar-Geophysical Data comprehensive reports

Data for July 1977–June 1977 & Miscellanea

Explanation of Data Reports Issued as Number 390 (Supplement) February 1977



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Solar - Geophysical Data

NO. 401 JANUARY 1978

Part II (Comprehensive Reports)

DATA FOR
JULY 1977
JUNE 1977
& MISCELLANEA

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
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No. 401

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar-Terrestrial Data Services Division

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F.1f	Cosmic Ray Neutron Counts (Calgary)	393B 44	394B 36	394B 36	394A110	395A114	396A110	397A109	400B 70	400B 70			
F.1g	Cosmic Ray Neutron Counts (Sulphur Mountain)	393B 44	394B 36	394B 36	394A110	395A114	396A110	397A109	400B 70	---			
F.1h	Cosmic Ray Neutron Counts (Thule)												
F.1i	Cosmic Ray Neutron Counts (Kiel)	391A109	392A 96	393A109	394A110	395A114	396A110	397A109	398A116	399A115	400A112	401A108	
F.1j	Cosmic Ray Neutron Counts (Tokyo)	391A109	392A 96	393A109	394A110	395A114	396A110	397A109	398A116	399A115	400A112	401A108	
F.1k	Cosmic Ray Neutron Counts (Kula)					395A114	396A110	397A109	398A116				
H.	MISCELLANEOUS												
H.60	IUWDS Alert Decisions	390A 4	391A 5	392A 5	393A 5	394A 5	395A 4	396A 5	397A 4	398A 4	399A 4	400A 4	401A 4
H.62	Abbreviated Calendar Record	396B 28	397B 24	398B 34	399B 26	400B 42	401B 28						

Notes:

"391A 34" listed under 1977 Jan means that data for January 1977 were contained in *Solar-Geophysical Data* Number 391 - Part I, beginning on page 34.

A = Part I, B = Part II.

----- = no data available.
blank = data not yet received.

JULY 1977 DATA

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ACTIVE REGIONS

CARRINGTON ROTATION 1656

(June 13 - July 10, 1977)

Region No.	Coordinates		Age at CMP	IMP.	Spot-less Region	Region No. in Rotation 1655	Activity at West Limb
	Lat.	Long.					
1	32°N	348°	+1	1	x		decreasing
2	26 N	342	>6	1	x		dispersed
3	31 N	253	>6	1	x		dispersed
4	9 S	228	>6	1	x		decreasing
5	32 N	229	-4	1	x		decreasing
6	27 N	223	>6	1	x		decreasing
7	3 N	214	0	1	x		disappeared
8	22 N	209	>6	2		(6)	decreasing
9	22 S	205	>6	4			decreasing
10	24 S	196	>6	1	x		decreasing
11	25 S	157	-3	1	x		decreasing
12	28 N	154	>6	1	x		dispersed
13	18 S	150	+2	1	x		disappeared
14	22 N	146	>6	1	x	(15)	dispersed
15	30 N	144	+6	1	x		disappeared
16	16 N	142	>6	5			decreasing
17	30 N	140	>6	1	x		decreasing
18	40 N	133	-1	4			stable
19	20 N	123	>6	1	x	(16+17)	dispersed
20	21 N	94	+4	1	x		dispersed
21	22 N	93	-2	3			increasing
22	23 N	65	-4	1	x		stable
23	26 S	58	>6	1	x	(20)	dispersed
24	28 S	58	-2	1	x		decreasing
25	21 N	31	-2	1	x		increasing
26	18 N	27	>6	2			decreasing
27	21 S	0	>6	2		(23)	decreasing

ACTIVE REGIONS

CARRINGTON ROTATION 1657

(July 10 - August 6, 1977)

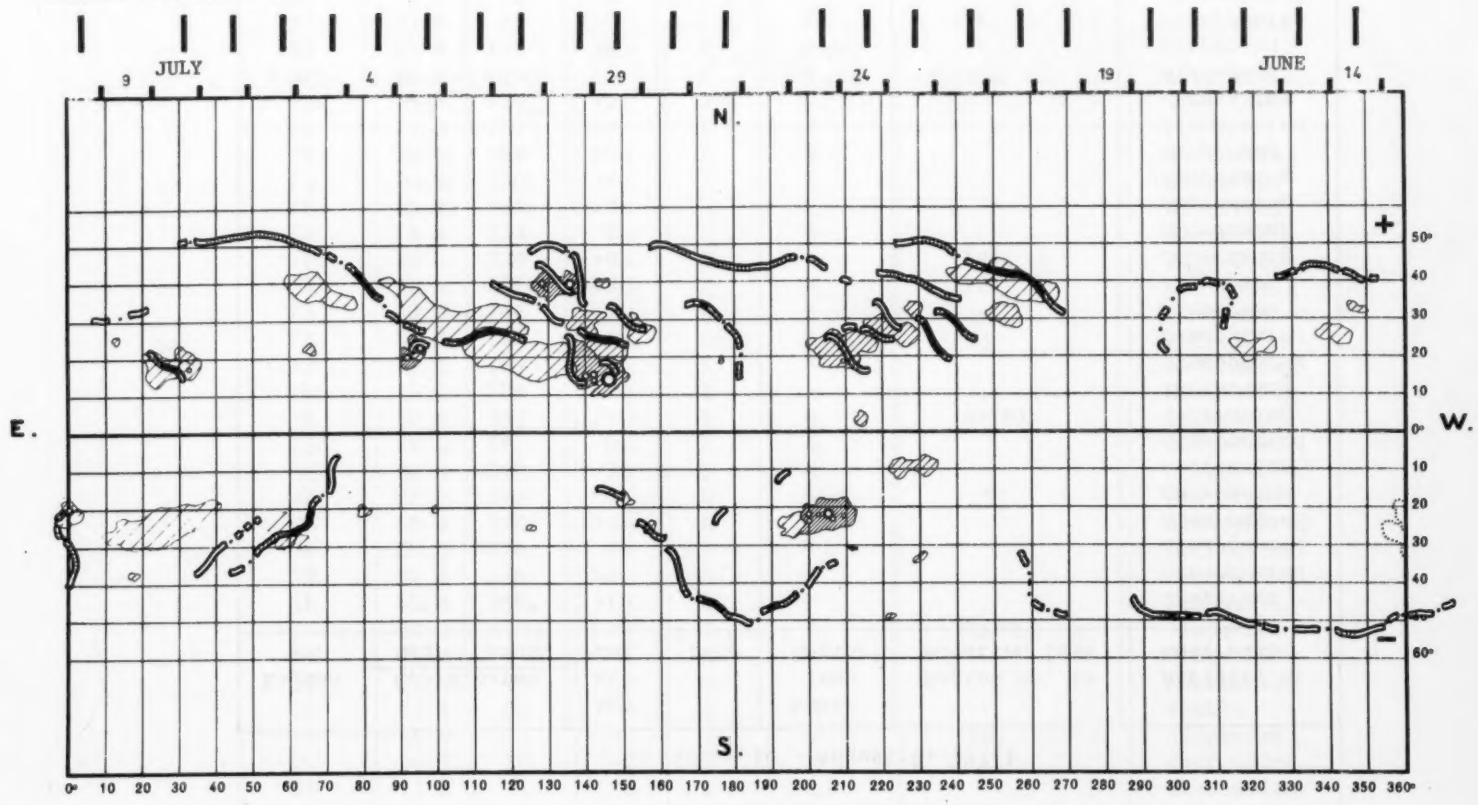
Region No.	Coordinates		Age at CMP	IMP.	Spot-less Region	Region No. in Rotation 1656	Activity at West Limb
	Lat.	Long.					
1	29°S	346°	+1	1	x		dispersed
2	27 N	339	>6	1	x		disappeared
3	19 N	337	0	1	x		disappeared
4	18 N	316	+5	1	x		disappeared
5	15 S	268	-2	1	x		decreasing
6	22 N	246	-3	1	x		decreasing
7	7 S	217	0	1	x		disappeared
8	25 S	203	>6	1	x	(9+10)	decreasing
9	21 N	189	+2	2			increasing
10	11 N	183	+3	1	x		disappeared
11	21 N	181	+4	1	x		disappeared
12	30 S	162	+1	1	x		dispersed
13	12 N	151	>6	1	x	(16)	dispersed
14	20 N	139	>6	2		(16)	decreasing
15	19 S	133	-1	1	x		decreasing
16	24 S	132	>6	2			decreasing
17	17 N	130	>6	1	x		decreasing
18	26 S	124	>6	1	x		dispersed
19	17 N	121	>6	1	x		disappeared
20	29 N	116	-2	2			decreasing
21	39 N	113	-3	1	x	(17)	dispersed
22	22 N	115	>6	1	x		dispersed
23	23 N	94	>6	1	x	(21)	disappeared
24	12 N	91	-2	1	x		disappeared
25	24 N	40	>6	1	x		dispersed
26	20 N	39	+2	1	x		disappeared
27	17 S	10	+2	2			stable
28	21 S	8	-3	1	x		disappeared

SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1656

JUNE 13 - JULY 10, 1977

MEUDON OBSERVATORY

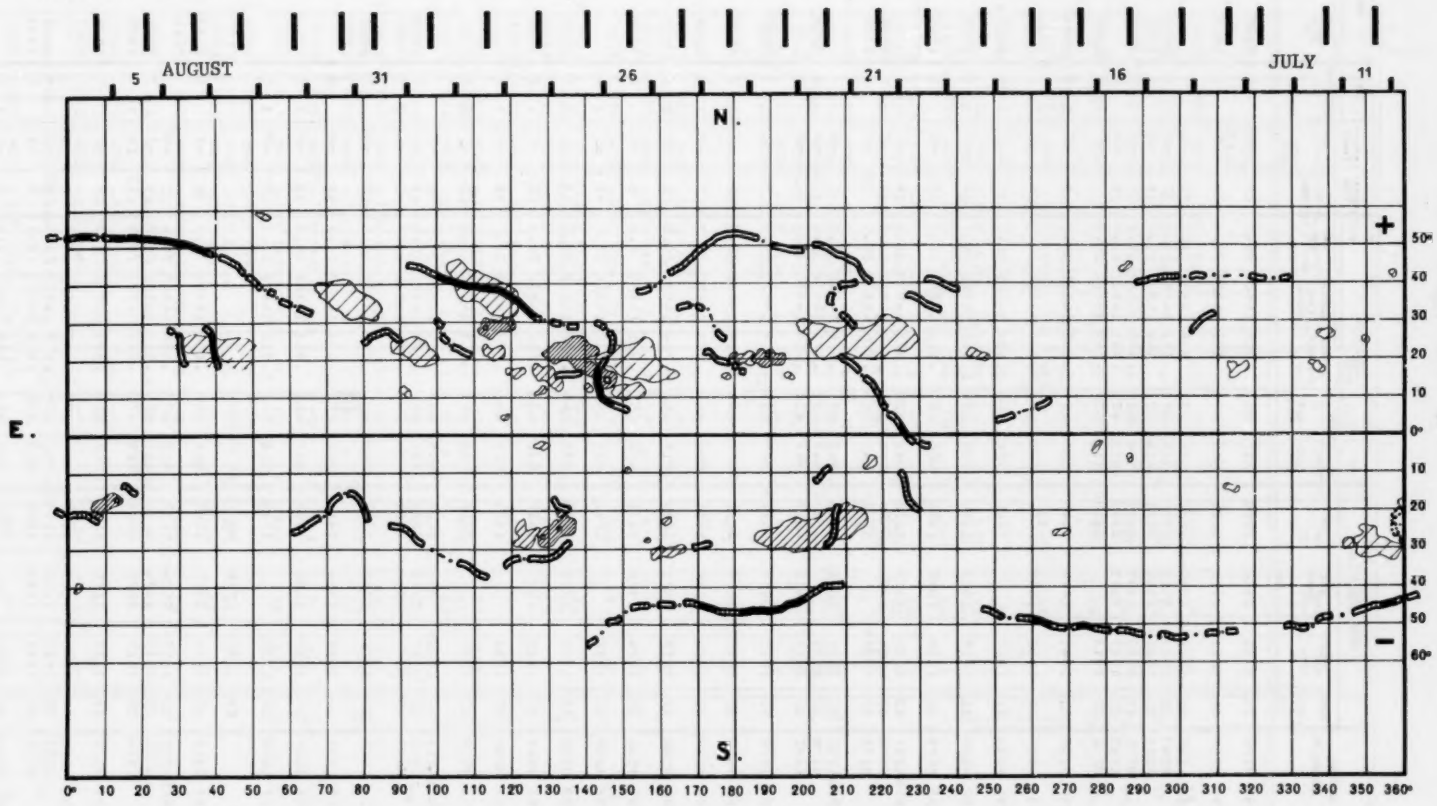


SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1657

JULY 10 TO AUGUST 6, 1977

MEUDON OBSERVATORY



7 Jul 77

Hα SOLAR FLARES

JULY 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE 1977 JUL	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
193 HTPR	01	0511	0522	0540	N17	W12	.316	14822	30.3	29	-F		C	0522	10	.1		Y5
194 HTPR	01	0611	0615	0625	N15	W20	.393	14822	29.8	14	-F		C	0615	10	.1		Y5
GRP64195	01	0902+5	0909+2	0927	N14	W20	.386	14822	29.9	25	-N				60	.6	E	
MONT	01	0902	0911	0929	N15	W20	.393	14822	29.9	27	-F		C	0911	40		E	
ZURI	01	0905	0909	0921	N14	W21	.399	14822	29.8	16	-N		C	0909	70	.8		
HTPR	01	0905	0909	0925	N14	W20	.386	14822	29.9	20	-N		C	0909	60	.6	E	
KANZ	01	0907	0911	0933	N15	W20	.393	14822	29.9	26	-N		C				E	
UPIC	01	0910		0910D	N14	W20	.366	14822	29.9		-F		P	0910	122		E	
196 HUAN	01	1441	1444	1446	S20	W90	1.000	14815	24.9	5	-F	1	C	1444	20		D	Y5
197 HUAN	01	1452	1500	1506	S20	W90	1.000	14815	24.9	14	-F	2	C	1500	40			Y5
198 HUAN	01	1817		1840	S20	W90	1.000	14815	25.0	23	-F	1	C	1827	15			Y5
199 HUAN	01	1917	1923	1934	S20	W90	1.000	14815	25.1	17	-F	1	C	1923	15		D	Y5
200 HCMA	01	1932	1940	1955	N23	W24	.511	14822	30.0	23	-N		C	1940	30	.4	D	Y5
GRP64201	02	0524	0527	0558	N40	W22	.670	14832	30.6	34	-F						E	
HTPR	02	0524	0527	0558	N40	W21	.664	14832	30.7	34	-F		C	0527	50	.7	E	
HITK	02	0535E		0542D	N40	W23	.675	14832	30.5	7D	-F		C	0535	50	.7	E	
GRP64202	02	0601	0626	0647	N40	W21	.664	14832	30.7	46	-N						D	
HTPR	02	0601		0633D	N40	W22	.670	14832	30.6	32D	-N		C	0612	50	.7		
KANZ	02	0618E	062E	0647	N40	W20	.659	14832	30.8	29D	-N		C				DT	
203 CATA	02	0615	0620	0620D	N14	W34	.578	14822	29.7	5D	-B	1		0620	56	.7	T	Y5
204 HUAN	02	1617	1620	1622	N17	W40	.665	14822	29.7	5	-F	1	C	1620	20	.3	D	Y5
205 HUAN	02	1921	1925	1928	N14	W41	.668	14822	29.7	7	-F	1	C	1925	30	.4		Y5
206 HUAN	02	2017	2021	2022	N18	W43	.704	14822	29.6	5	-F	1	C				E	Y5
207 MEUD	03	0924	0926	0930	N16	E67	.921	14835	8.4	6	-F		C	0926	30		D	Y5
208 HUAN	03	1502		1542	N38	W40	.772	14832	30.6	40	-F	1	C					Y5
209 HUAN	03	1550	1559	1608	N38	W40	.772	14832	30.7	18	-F	1	C	1559	45	.7		Y5
210 HUAN	03	1622	1627	1637	N38	W39	.765	14832	30.8	15	-F	1	C	1627	40	.6		Y5
211 HUAN	03	1901		1929	N38	W41	.779	14832	30.7	28	-F	1	C					Y5
212 HUAN	03	1952		2017	N38	W41	.779	14832	30.8	25	-F	1	C					Y5
GRP64213	03	2350+5	2355+2	0000	N38	W44	.801	14832	30.7	10	-F				35	.6		
CULG	03	2350	2355	0000	N38	W45	.808	14832	30.6	10	-F		C	2355	40	.7		
HANI	03	2355	2357	0000	N39	W44	.806	14832	30.7	5	-F	3	P	2357	30	.5		
214 CULG	04	0318	0322	0331	N40	W45	.817	14832	30.8	13	-N		C	0322	80	1.4		Y5
215 KANZ	04	0833	0854	0913	S21	E90	1.000	14836	11.1	40	-N		C					Y5
216 HUAN	04	1555	1600	1605	N12	W66	.913	14822	29.7	10	-F	1	C					Y5
217 HUAN	04	1736		1748	S18	E88	1.000	14838	11.3	12	-F	1	C					Y5
	04	2207	2214	NO FLARE PATROL														
218 CULG	05	0149	0157	0245	N38	W57	.886	14832	30.8	56	-F		C	0157	25	.6	K	Y5
GRP64219	05	0615>9	0624+1	0637	N10	W73	.955	14822	29.8	22	-N				60		E	
HTPR	05	0615	0624	0634	N12	W74	.960	14822	29.7	19	-F		C	0624	50		E	
CATA	05	0625	0625	0640D	N09	W72	.950	14822	29.9	15D	1N	1		0625	84			
220 HTPR	05	1120	1125	1135	N40	W60	.908	14832	1.0	15	-F		C	1125	40	.8	E	Y5
GRP64221	05	1140+1	1143+0	1148	N12	W77	.973	14822	29.7	8	-B				70			
ZURI	05	1140	1143	1143D	N12	W78	.977	14822	29.6	3D	-3		P	1143	50			
HTPR	05	1141	1143	1148	N13	W76	.969	14822	29.8	7	-B		C	1143	100			
222 HUAN	05	1258		1304	N40	W60	.908	14832	1.0	6	-F	1	C					Y5

Hα SOLAR FLARES

JULY 1977

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE 1977 JUL	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONF.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	05	2204	2221	NO FLARE PATROL														
	05	2227	9001	NO FLARE PATROL														
223 HTPR	06	0637	0646	0657	N22	W35	.625	14841	3.7	20	-F		C	0646	10	.1		Y5
224 MONT	06	0802	0804	0811	N21	W34	.608	14841	3.8	9	-F		C	0804	40		E	Y5
225 MONT	06	0855	0857	0900	N21	W34	.608	14841	3.8	5	-F		C	0857	20		OH	Y5
226 MONT	06	0906	0911	0919	N21	W35	.620	14841	3.8	13	-F		C	0911	20		OH	Y5
GRP64227	06	1031	1042	1115D	N22	W37	.648	14841	3.7	44	-F						EK	
MONT	06	1031	1042	1115D	N21	W35	.620	14841	3.8	440	-F		C	1042	60		EK	
KHAR	06	1043E	1043	1100	N24	W40	.691	14841	3.4	170	-F		C				E	
GRP64228	06	1134+2	1137+3	1154	N21	W38	.655	14841	3.6	20	-N				40	.5	E	
HTPR	06	1134	1137	1200	N22	W36	.660	14841	3.6	26	-F		C	1137	30	.4	E	
MCMA	06	1134	1137	1149	N20	W37	.639	14841	3.7	15	-N		C	1137	30	.7	E	
ZURI	06	1136	1140	1154	N21	W38	.655	14841	3.6	18	-N		C	1140	60	.8		
GRP64229	06	1217+1	1220+0	1225	N21	W38	.655	14841	3.7	8	-F				70	.9		
HTPR	06	1217	1220	1226	N22	W38	.660	14841	3.7	9	-F		C	1220	60	.7		
ZURI	06	1218	1220	1224	N21	W38	.655	14841	3.7	6	-N		C	1220	90	1.3		
GRP64230	06	1325+1	1327+1	1343	N21	W37	.643	14841	3.8	18	-N				60	.8	EH	
HTPR	06	1254	1305	1345	N24	W39	.670	14841	3.7	51	-F		C	1305	40	.5		
MCMA	06	1325	1328	1341	N20	W38	.651	14841	3.7	16	-N		C	1328	40	.5	EH	
HTPR	06	1325	1327	1340	N22	W38	.660	14841	3.7	15	-N		C	1327	80	1.0		
ZURI	06	1326	1328	1338	N21	W38	.655	14841	3.7	12	-N		C	1328	60	.8		
WEND	06	1332E		1355	N20	W36	.627	14841	3.9	230	-N							
231 HTPR	06	1418	1421	1424	N22	W40	.682	14841	3.6	6	-F		C	1421	20	.2		Y5
GRP64232	06	1522+2	1526+3	1533	N23	W39	.676	14841	3.7	11	-F				40	.5		
KANZ	06	1522	1529	1549	N21	W40	.679	14841	3.6	27	-N		C					
HTPR	06	1523	1526	1531	N24	W39	.680	14841	3.7	8	-F		C	1526	30	.4		
HUAN	06	1524	1528	1533	N23	W38	.665	14841	3.8	9	-F	1	C	1528	45	.6		
233 HTPR	06	1545	1550	1605	N24	W39	.680	14841	3.7	20	-F		C	1550	20	.2		Y5
GRP64234	06	1643+2	1647+0	1649	N12	W90	1.000	14822	29.9	6	-N				30		A	
HTPR	06	1643	1647	1650	N12	W90	1.000	14822	29.9	7	-N		C	1647	20		A	
HUAN	06	1645	1647	1648	N12	W90	1.000	14822	29.9	3	-N	2	C	1647	40			
235 MCMA	06	1827	1829	1830D	N20	W41	.685	14841	3.7	30	-F		C	1829	35	.4	D	Y5
GRP64236	06	1837+3	1845+1	1851	N21	W42	.700	14841	3.6	14	-N				70	1.0	E	
HUAN	06	1837	1846	1849	N23	W42	.708	14841	3.6	12	-N	2	C	1846	60	.9	E	
PALE	06	1840	1845	1853	N20	W42	.697	14841	3.6	13	-N	3	C		83		DE	
237 VORO	06	2138	2139	2144	N21	W43	.711	14841	3.7	6	-B		C	2139	27	.4	EJ	Y5
GRP64238	06	2305+4	2309+1	2319	N22	W44	.726	14841	3.7	14	-N				100	1.5	DJ	
VORO	06	2305	2309	2322	N24	W45	.743	14841	3.6	17	-B		C	2309	99	1.5	DJ	
PALE	06	2309	2310	2316	N21	W44	.722	14841	3.7	7	-F	3	C		97			
239 VORO	06	2336	2340	2350	N24	W45	.743	14841	3.6	14	-B		C	2340	72	1.1	DJ	Y5
240 VORO	07	0013	0019	0044	N24	W45	.743	14841	3.6	31	-B		C	0019	90	1.3	DJ	Y5
GRP64241	07	0523+5	0529+0	0536	N22	W48	.767	14841	3.6	13	-F							
CULG	07	0523	0529	0539	N23	W48	.770	14841	3.6	16	-F		C	0529	65	1.0		
HTPR	07	0528	0529	0533	N22	W48	.767	14841	3.6	5	-F		C	0529	10	.1		
242 MONT	07	1047	1050	1056	N42	W90	.999	14832	30.7	9	-F		C	1050	20		D	Y5
243 KANZ	07	1349E	1351	1355	N22	W52	.805	14841	3.7	60	-F		P				T	Y5
GRP64244	07	1609	1614	1634	N23	W53	.817	14841	3.7	25	-F							
HTPR	07	1609	1614	1629	N23	W53	.817	14841	3.7	20	-F		C	1614	10	.2		
HUAN	07	1630E		1638D	N23	W53	.817	14841	3.7	80	-F	1	P	1635	40	.7		
245 HUAN	07	1630E		1638D	N46	W85	.995	14832	1.3	80	-F	*	P					Y5
246 HTPR	07	1642	1645	1655	N23	W53	.817	14841	3.7	13	-N		C	1645	20	.3		Y5
247 HTPR	07	1703		1727D	N46	W82	.990	14832	1.6	240	-F		C	1715	20			Y5

Hα SOLAR FLARES

JULY 1977

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE 1977 JUL	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	07	1727	2121	NO FLARE PATROL														
248 HCMA	07	2013E		2043D	N23	W56	.843	14841	3.6	30D	-N		C	2013	25	.5	D	Y5
	07	2124	2134	NO FLARE PATROL														
	07	2138	2150	NO FLARE PATROL														
249 CULG	07	2308	2312D	2312D	N20	W59	.864	14841	3.5	4D	-N		P	2312	55	1.0		Y5
250 CULG	08	0211	0220	0309	N20	W61	.879	14841	3.5	58	-F		C	0220	60	1.2		Y5
251 CULG	08	0340	0345	0438	N20	W61	.879	14841	3.6	58	?N		C	0345	130	2.6		Y5
	IMP.1 NO I TACH1																	
252 CULG	08	0446	0453	0509	N21	W61	.880	14841	3.6	23	?F		C	0453	110	2.2		Y5
	IMP.1 NO I TACH1																	
253 CATA	08	0920E	0920	0935	N21	W64	.902	14841	3.6	15D	-N	1		0920	56	1.4		Y5
254 HTPR	08	1506	1507	1510	N22	W67	.923	14841	3.6	4	-F		C	1507	30	.6		Y5
255 HCMA	08	1922E		1924D	N22	W72	.951	14841	3.4	2D	-F		P	1922	20	.9	BD	Y5
256 CULG	08	2340	2347	0005	N25	W74	.961	14841	3.4	25	-F		C	2347	50			Y5
	09	1956	1959	NO FLARE PATROL														
	09	2002	2008	NO FLARE PATROL														
	09	2030	2040	NO FLARE PATROL														
	09	2130	2151	NO FLARE PATROL														
257 HTPR	10	0542E		0735	N23	W70	.940	14849	5.0	113D	-F		C	0704	20	.4	E	Y5
258 HTPR	10	0750		0916D	N23	W70	.940	14849	5.1	86D	-F		C	0810	10	.2	E	Y5
259 RAMY	10	1232E	1233U	1249	N23	W90	1.000	14841	3.8	17D	-F	3	C					Y5
260 HTPR	10	1349	1358	1417	N25	W90	1.000	14841	3.8	28	-F		C	1358	50		A	Y5
	10	2019	2140	NO FLARE PATROL														
	10	2152	2158	NO FLARE PATROL														
	11	1918	1935	NO FLARE PATROL														
	11	1949	2016	NO FLARE PATROL														
	11	2022	2032	NO FLARE PATROL														
	11	2038	2055	NO FLARE PATROL														
261 HTPR	12	0814	0822	0824	N23	W48	.767	14835	8.7	10	-F		C	0822	20	.3		Y5
262 HTPR	12	0841	0843	0847	N23	W48	.767	14835	8.8	6	-F		C	0843	20	.3		Y5
GRP64263	12	1140+1	1141+5	1200	N21	W51	.792	14835	8.7	20	-N				50	.8	G	
HTPR	12	1140	1146	1205	N23	W49	.777	14835	8.8	25	-N		C	1146	80	1.2		
RAMY	12	1140E	1141U	1150	N21	W51	.792	14835	8.7	10D	-F	4	C		40			
KANZ	12	1141	1145	1159	N21	W51	.792	14835	8.7	18	-F		C				G	
CATA	12	1145	1145	1200D	N19	W53	.807	14835	8.6	15D	-B	1		1145	56	1.0		
GRP64264	12	1722+8	1732+1	1738	S20	W25	.564	14838	10.8	16	-N				70	.8	E	
WEND	12	1722E		1740	S20	W22	.534	14838	11.1	18D	1N		V		300			
HTPR	12	1724	1733	1737	S20	W27	.585	14838	10.7	13	-F		C	1733	80	1.0	E	
HUAN	12	1727	1732	1739	S22	W25	.584	14838	10.9	12	-N	1	C	1732	70	.9	E	
KANZ	12	1729	1732	1735	S20	W25	.564	14838	10.9	6	-N		P					
PALE	12	1730	1732	1737	S20	W25	.564	14838	10.9	7	-F	3	C		60		DE	
	12	1953	1911	NO FLARE PATROL														
GRP64265	13	0010+4	0018	0040	S21	W28	.605	14838	10.9	30	-N				50	.6	E	
CULG	13	0010	0018	0040	S21	W29	.615	14838	10.8	30	-N		C	0018	60	.8		
MITK	13	0014		0026D	S22	W29	.613	14838	10.9	12D	-B		C	0016	50	.7	E	
	13	0112	0118	NO FLARE PATROL														
	13	0131	0137	NO FLARE PATROL														
GRP64266	13	1036	1041+6	1116	S21	W34	.666	14838	10.9	40	-N				120	1.6	E	
HTPR	13	1036	1041	1112	S18	W36	.667	14838	10.7	36	-F		C	1041	100	1.3	E	
ATHN	13	1046E	1047	1058D	S22	W32	.653	14838	11.0	12D	-N	1			147			
HCMA	13	1101E		1120	S22	W34	.673	14838	10.9	19D	-N		C	1101	50	.7	E	
267 HUAN	13	1409	1412	1414	S22	W36	.693	14838	10.9	5	-F	1	C	1412	20	.3	D	Y5

Hα SOLAR FLARES

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE 1977 JUL	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
268 HTPR	14	0615	0621	0636	S17	W47	.777	14838	10.7	21	-F		C	0621	40	.6	Y5
269 MONT	14	0733	0738	0744	S22	W43	.761	14838	11.1	11	-F		C	0738	20		Y5
270 HTPR	14	1004	1005	1011	S17	W48	.787	14838	10.8	7	-F		C	1005	30	.4	E Y5
GRP64271	14	1004+1	1009+1	1015	N23	W79	.976	14835	8.6	11	-N				50		G
MONT	14	1004	1009	1014	N23	W79	.979	14835	8.5	10	-F		C	1009	50		G
CATA	14	1005	1010	1015D	N23	W77	.972	14835	8.6	100	1N	1		1010	56		
272 MONT	14	1036	1039	1044	S19	W49	.804	14838	10.8	8	-F		C	1039	40		E Y5
GRP64273	14	1147+1	1154+1	1228	S22	W48	.807	14838	10.9	41	1N				130	2.2	EIL
KIEV	14	1147E	1155	1230D	S25	W47	.811	14838	11.0	43D	1N		C	1155	200	3.6	EI
HTPR	14	1147	1154	1215	S17	W50	.806	14838	10.7	28	-N		C	1158	130	2.0	E
HCMA	14	1148	1154	1240	S22	W47	.798	14838	11.0	52	-B		C	1154	70	1.2	EL
KHAR	14	1148E	1155	1225D	S22	W48	.807	14838	10.9	37D	1N		C		110	2.1	E
CATA	14	1200E	1200	1215D	S22	W47	.798	14838	11.0	15D	1B	1		1200	140	2.4	
HUAN	14	1205E		1223	S22	W48	.807	14838	10.9	23D	-F	1	P	1211	25	.4	D
274 HUAN	14	1230	1231	1238	S22	W47	.798	14838	11.0	8	-F	1	C	1231	25	.4	D Y5
275 HUAN	14	1638	1645	1650	S23	W48	.811	14838	11.1	12	-F	1	C	1645	20	.3	D Y5
276 HUAN	14	1825E		1829D	S21	W52	.837	14838	10.9	4D	-F	1	P	1827	20	.4	D Y5
	14	1949	1950	NO FLARE PATROL													
	14	2004	2008	NO FLARE PATROL													
277 MONT	16	0836	0838	0840	S22	W74	.974	14838	10.8	4	-F		C	0838	20		DG Y5
	16	1600	1610	NO FLARE PATROL													
	16	2011	2156	NO FLARE PATROL													
	17	0043	0054	NO FLARE PATROL													
	17	1846	1854	NO FLARE PATROL													
	17	1857	1921	NO FLARE PATROL													
	17	2345	2353	NO FLARE PATROL													
278 CATA	19	1145E	1200	1220	N19	E65	.905	14863	24.4	35D	1F	1		1200	84	2.0	Y5
279 HUAN	19	1906		1917	N20	E90	1.000	14866	26.5	11	-F	1	C				Y5
	19	2131	2148	NO FLARE PATROL													
	20	0049	0056	NO FLARE PATROL													
	21	0121	0136	NO FLARE PATROL													
	21	0146	0204	NO FLARE PATROL													
280 MONT	21	1021	1028	1030D	N37	E90	.999	14872	28.2	9D	-F		C	1028	20		Y5
	21	1823	1824	NO FLARE PATROL													
	21	1828	1842	NO FLARE PATROL													
	21	1853	1907	NO FLARE PATROL													
	21	1911	1915	NO FLARE PATROL													
	21	1947	1950	NO FLARE PATROL													
	21	1955	2007	NO FLARE PATROL													
	21	2022	2025	NO FLARE PATROL													
	21	2034	2037	NO FLARE PATROL													
GRP64281	21	2305+0	2313+6	2329	S24	E90	1.001	14874	28.7	24	1N				70		DH
CULG	21	2305	2313	2331	S26	E90	1.001	14874	28.7	26	1N		C	2313	45		
MITK	21	2305E	2319	2327	S22	E90	1.001	14874	28.7	22D	1N		C	2319	90		DH
282 MONT	22	0751E	0751	0755D	S25	E81	.995	14874	28.4	4D	-F		C	0751	20		D Y5
GRP64283	22	0937+1	0944 1001+1	1005	S25	E78	.989	14874	28.3	28	-F				15		D
HTPR	22	0937	0944	0950	S25	E76	.983	14874	28.1	13	-F		C	0944	20		
HONT	22	0938	1001	1005D	S25	E80	.993	14874	28.4	27D	-F		C	1001	20		D
HTPR	22	0956	1002	1005	S25	E76	.983	14874	28.1	9	-F		C	1002	10		
GRP64284	22	1149+2	1158+1	1208	S26	E78	.989	14874	28.3	19	-N				50		E
HTPR	22	1149	1159	1205D	S25	E75	.980	14874	28.1	16D	-N		C	1159	60		
ZURI	22	1151	1159	1203D	S26	E77	.987	14874	28.3	12D	-F		P	1159	50		
RAMY	22	1155E	1158U	1209	S25	E75	.980	14874	28.1	14D	-F	2	C		64		DE
HUAN	22	1155E	1159	1207	S27	E85	.999	14874	28.9	12D	-N	2	P	1159	30		
HCMA	22	1156E	1158	1208	S26	E80	.993	14874	28.5	12D	-B		C	1158			E

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE 1977 JUL	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
285 HUAN	22	1300	1306	1309	S26	E80	.993	14874	28.5	9	-F	1	C	1306	20		D Y5
286 HUAN	22	1316	1319	1320	S24	E80	.992	14874	28.6	4	-F	1	C	1319	15		D Y5
287 HUAN	22	1516	1520	1523	S25	E80	.993	14874	28.6	7	-F	1	C	1520	20		D Y5
288 HUAN	22	1810		1819	S25	E75	.980	14874	28.4	9	-F	1	C				Y5
289 HUAN	22	1837	1838	1840	S25	E74	.977	14874	28.3	3	-F	1	C	1838	20		D Y5
290 HUAN	22	1902		1907	S25	E75	.980	14874	28.4	5	-F	1	C				Y5
	23	0156	0206	NO FLARE PATROL													
	23	0240	0247	NO FLARE PATROL													
291 MONT	23	0837	0846	0907	S26	W77	.987	14860	17.6	30	-F		C	0846	20		DGH Y5
292 MONT	23	0941	0947	1032	S25	E64	.933	14874	28.2	51	-N		C	0947	100		E Y5
	23	2120	2154	NO FLARE PATROL													
293 CULG	23	2236	2244	2254	S25	E59	.904	14874	28.4	18	-N		C	2244	25	.5	Y5
	23	2305	2313	NO FLARE PATROL													
294 HTPR	24	0520	0522	0527	S25	E52	.855	14874	28.1	7	-F		C	0522	30	.5	Y5
GRP64295	24	0533+5	0543+2	0558	S26	E52	.859	14874	28.1	25	-F				50	.9	E
HTPR	24	0533	0545	0558	S27	E51	.855	14874	28.1	25	-F		C	0543	40	.6	E
MITK	24	0538	0543	0558	S26	E54	.873	14874	28.3	20	-N		C	0543	70	1.5	E
296 HTPR	24	0830E	0848	0955	S27	E52	.863	14874	28.3	85D	-F		C	0848	20	.4	D Y5
297 HUAN	24	1822	1825	1840	S27	E47	.825	14874	28.3	18	-F	1	C	1825	20	.4	D Y5
	24	1944	1945	NO FLARE PATROL													
	24	2106	2107	NO FLARE PATROL													
	24	2120	2126	NO FLARE PATROL													
	24	2239	2244	NO FLARE PATROL													
GRP64298	25	0800>3	0816+1	0847	S26	E38	.746	14874	28.2	47	1N				240	3.6	
MONT	25	0800	0816	0847	S25	E39	.749	14874	28.3	47	1N		C	0816	400		
CATA	25	0810	0817	0855	S26	E37	.738	14874	28.1	45	1N	2		0817	281	4.3	
ATHN	25	0820E	0820	0841	S27	E45	.810	14874	28.7	21D	-N	1			131		
HTPR	25	0825E		0828D	S26	E38	.746	14874	28.2	3D	1F		C	0825	200	3.0	B
299 MONT	25	0921	0936	1009D	N19	W21	.417	14863	23.8	48D	-F		C	0936	40		EG Y5
300 KHAR	25	0939E	0943	0946D	S25	E37	.731	14874	28.2	7D	-F		C				E Y5
GRP64301	25	2139+1	2141+2	2152	S25	E29	.660	14874	28.1	13	-F						
RAMY	25	2139	2141U	2145D	S25	E30	.669	14874	28.2	6D	-F	2	C		95		F
HUAN	25	2140	2143	2152	S26	E29	.669	14874	28.1	12	-F	1	C	2143	30	.4	E
302 CULG	26	0020	0039	0130	S28	E28	.680	14874	28.1	7D	-F		C	0039	50	.7	Y5
	26	0925	0945	NO FLARE PATROL													
303 CATA	26	0935E	0935	0935D	N40	E36	.736	14872	29.1		-N	2		0935	28	.4	Y5
GRP64304	26	1348+3	1352+1	1406	S26	E21	.607	14874	28.1	18	-F				50	.6	E
HTPR	26	1348	1353	1407	S27	E20	.611	14874	28.1	19	-F		C	1353	40	.5	E
MCMA	26	1351	1352	1405	S26	E22	.614	14874	28.2	14	-F		C	1352	60	.8	E
305 HUAN	26	1604E		1612	N23	E60	.869	14876	31.2	8D	-F	1	P	1605	25	.5	D Y5
306 MCMA	26	1743E	1750	1805D	N21	W39	.655	14863	23.8	22D	-F		C	1750	35	.5	E Y5
	26	2013	2024	NO FLARE PATROL													
	26	2054	2144	NO FLARE PATROL													
307 CULG	26	2324	2329	0020	N23	W42	.697	14863	23.8	56	-N		C	2329	50	.7	K Y5
308 CULG	27	0230	0248	0314	N21	W45	.723	14863	23.7	44	-F		C	0248	60	.8	Y5
309 CULG	27	0520	0533	0544	N22	W45	.726	14863	23.9	24	-F		C	0533	30	.4	Y5

Hα SOLAR FLARES

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS	
	DATE 1977 JUL	START	MAX. PHASE	END	APPROX LAT.	APPROX LONG. FROM CENTRAL MERID.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Millionths of Disk	CORR AREA Sq. Deg.		
310 BUCA	27	0640		0655	N21	W47	.745	14863	23.4	15	-N		C	0640	53	.8	CD	Y5
311 MONT	27	0927	0938	0946	N19	W49	.762	14863	23.7	19	-F		C	0934	20		D	Y5
312 MCMA	27	1120	1122	1126	S26	E11	.547	14874	26.3	6	-F		C	1122	40	.5	E	Y5
	27	1359	1405	NO FLARE PATROL														
313 MCMA	27	1547	1550	1618	N22	W53	.807	14863	23.7	31	-N		C	1550	60	1.1	E	Y5
314 MCMA	27	1950	1954	2020	N22	W55	.825	14863	23.7	30	-N		C	1954	50	.9	DH	Y5
	27	2057	2113	NO FLARE PATROL														
	27	2118	2128	NO FLARE PATROL														
315 CULG	27	2330	2335	0000	N20	W55	.823	14863	23.9	30	-F		C	2335	20	.4		Y5
	28	0237	0241	NO FLARE PATROL														
316 UPIC	28	0540	0600	0645D	N20	W61	.874	14863	23.7	65D	-F		P	0600	41		K	Y5
317 HUAN	28	1225E		1227D	N21	W65	.904	14863	23.6	2D	-F	1	P	1226	20	.4	D	Y5
318 MCMA	28	1538E		1548D	N22	W72	.947	14863	23.3	10D	-F		C	1539	25	.3	DH	Y5
	28	1610	1619	NO FLARE PATROL														
	28	1626	1641	NO FLARE PATROL														
	28	1646	1755	NO FLARE PATROL														
319 HUAN	28	1931		1935	N20	W75	.962	14863	23.2	4	-F	1	C					Y5
	28	1940	1952	NO FLARE PATROL														
	28	1956	2019	NO FLARE PATROL														
	28	2034	2037	NO FLARE PATROL														
	28	2044	2131	NO FLARE PATROL														
	28	2134	2139	NO FLARE PATROL														
320 MONT	29	0756	0846	0851	N19	W79	.977	14863	23.4	55	-F		C	0846	20		OK	Y5
321 MONT	29	1004	1010	1019	N19	W80	.981	14863	23.4	15	-F		C	1010	20		D	Y5
322 MONT	29	1058	1111	1118	N19	W80	.981	14863	23.5	20	-F		C	1111	20		D	Y5
323 MONT	29	1120	1131	1138	N19	W80	.981	14863	23.5	18	-F		C	1131	20		D	Y5
324 MONT	29	1241	1256	1335D	N35	W90	.998		22.8	54D	-F		C	1256	20		DG	Y5
GRP64325	29	1250	1253	1300	S26	W90	1.001	14855	22.9	10	-F						G	
			1256															
MONT	29	1250	1253	1300	S28	W90	1.001	14855	22.8	10	-F		C	1253	40		DG	
MONT	29	1254	1256	1259	S25	W90	1.001	14855	22.9	5	-F		C	1256	20		DG	
326 LVOV	29	1455E	1500	1515D	N21	W87	.997	14863	23.1	20D	-F		C	1500	100		DF	Y5
GRP64327	30	0704>?	0722	0800D	N18	W42	.680	14866	27.1	56	1N						E	
			0740															
MITK	30	0704	0722	0727D	N18	W42	.680	14866	27.1	23D	1N		C	0722	220	3.1	E	
BUCA	30	0715		0800	N14	W41	.659	14866	27.2	45	1F		C	0734	214	2.9	C	
CATA	30	0720	0740	0905	N19	W42	.682	14866	27.2	105	1B	2		0740	196	2.8		
328 CATA	30	0855	0855	0905	N24	W90	.999	14863	23.6	10	1N	2		0855	56			Y5
329 HUAN	30	1509	1515	1517	N21	W90	.999	14863	23.9	8	-F	1	C	1515	20		D	Y5
330 HUAN	30	1753	1757	1759	N21	W90	.999	14863	24.0	6	-F	1	C	1757	25		D	Y5
331 CATA	31	1505	1510	1525	N34	W08	.483		31.2	20	-N	2		1510	26	.3		Y5
332 HUAN	31	1911		1951	N28	W35	.643	14883	29.2	40	-F	*	C				E	Y5
	31	2040	2048	NO FLARE PATROL														

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

JULY 1977

DAILY FLARE INDICES
Includes all Flares

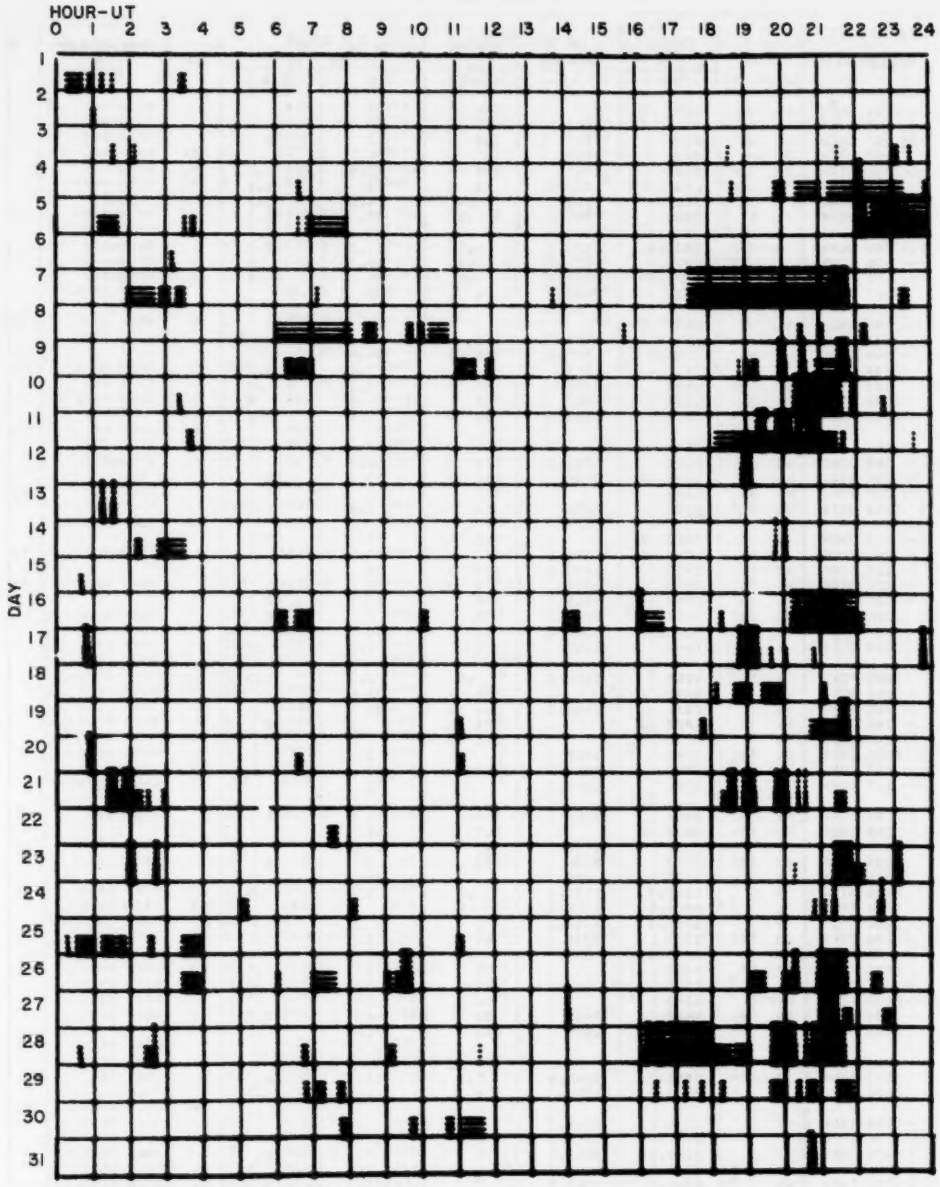
Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.
770701	19.21	24.0	770711	0.00	22.8	770721	3.43	22.6
770702	12.88	24.0	770712	7.72	23.7	770722	7.35	24.0
770703	10.99	24.0	770713	10.82	23.8	770723	2.54	23.0
770704	4.43	23.9	770714	23.54	23.9	770724	4.91	23.8
770705	7.52	22.2	770715	0.00	24.0	770725	39.48	24.0
770706	40.90	24.0	770716	.91	22.1	770726	9.76	22.7
770707	17.20	19.7	770717	0.00	23.2	770727	16.84	23.5
770708	4.22	24.0	770718	0.00	24.0	770728	3.39	20.9
770709	0.00	23.3	770719	4.22	23.7	770729	5.91	24.0
770710	3.38	22.6	770720	0.00	23.9	770730	15.41	24.0
						770731	6.76	23.9

When no Flare Index is given, it is 0 for that day.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

JULY 1977



Observatories included in total patrol:

Athenes	Herstmonceux	Kharkov	Manila	Ramey
Bucharest	Huancayo	Kiev	McMath-Hulbert	Tashkent
Catania	Istanboul	Kodaikanal	Meudon	Tehran
Culgoora	Kandilli	Locarno	Mitaka	Upice
Haute Provence	Kanzelhohe	Lvov	Monte Mario	Voroshilov
			Palehua	Wendelstein
				Zürich

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

JULY 1977

JUL 1977	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	POLARIZATION OR REMARKS
1	260	ONDR	44	NS	0551 E		559 D	30			
	245	SGMR	44	NS	0914 E	1513.4	906 D	59.2			3,CONT
	207	VORO	44	NS	2100	2147	240	12	8		
	3100	CRIM	24	R	0635	0752		4			
	2800	OTTA	21	GRF	1900	1945	110	2.6	1.3		
	2800	OTTA	20	GRF	1931	1932.5	13	3	1.5		
	606	SGMR	1	S	2005.9	2006	.4	4.1	1.2		CONT
	245	SGMR	6	S	2006	2006.3	.6	80.4	24.1		CONT
	410	SGMR	6	S	2006.1	2006.4	.5	29.3	8.8		CONT
	245	SGMR	6	S	2020.9	2021.2	4.5	51.7	15.5		CONT
	606	SGMR	2	S/F	2021.1	2021.3	1.3	4.1	.8		CONT
	410	SGMR	6	S	2021.2	2021.3	1.2	16	4.8		CONT
	207	VORO	4	S/F	2209	2209.5	1	155			
2	260	ONDR	44	NS	0607 E		479 D	22			
	127	TORN	43	NS	1200 E	1407.7	180 D	30			
	245	SGMR	43	NS	1204.5	1207.4	735.5D	54.4			
	2800	OTTA	1	S	1317	1319	6	1.6	0.6		
	2800	OTTA	20	GRF	1610	1625	30	1.2	.6		
	2800	OTTA	1	S	1950	1952	10	.6	.3		
	2695	PENT	20	GRF	2240	2305	55	2.4	1.2		
3	260	ONDR	44	NS	0606 E		544 D	12			
	245	SGMR	43	NS	1130	1728.2	770 D	46.8			CONT
	200	HIRA	44	NS	1950 E	0630	810 D	20	10		SR
	207	VORO	44	NS	2100		240		10		
	2800	OTTA	20	GRF	1905	1925	80	1.8	1.2		
4	260	ONDR	44	NS	0605 E		545 D	27	3.5		
	245	SGMR	44	NS	0916 E	1754.9	903 D	139.4			CONT
	127	TORN	43	NS	1030 U	1420.2	270 D	36			
	200	HIRA	44	NS	2040 E	0150	770 D	15	5		SR
	207	VORO	44	NS	2240	0005	140	18	13		
	3100	CRIM	20	GRF	0757	0846	133	5	2		
	127	TORN	41	F	1306.7	1309.2	11	30			
	2800	OTTA	1	S	1446	1448	8	1.6	.7		
5	2695	PENT	8	S	0118	0118.2	.8	2.6	1.3		
	260	ONDR	44	NS	0602 E		536 D	20			
	245	SGMR	44	NS	0916 E	1441.7	644 D	32			
	160	DWIN	44	NS	1022 E		171 D		3		
	240	DWIN	44	NS	1022 E		171 D		2		
	3100	CRIM	26	FAL	0940	1017		3			
	127	TORN	41	F	1006	1059.5	80	23			
	127	TORN			1006	1103.3		25			
6	200	HIRA	43	NS	0400	0500	140	10	5		SR
	260	ONDR	44	NS	0610 E		542 D	16			
	245	SGMR	43	NS	1411	1458.2	349	17.3			
	3100	CRIM	20	GRF	0733	0806	123	3	1		
	536	ONDR	8	S	1122	1122	.3	21			
	2800	OTTA	8	S	1137.3	1137.4	.6	1	.5		
	9100	ARCE	1		1215.9	1216.2	.5				
	1420	ARCE	2		1216.8	1217.1	1				
	2800	OTTA	20	GRF	1225	1237	45	1	.5		
	536	ONDR	3	S	1232.8	1232.8	.3	15			
	2800	OTTA	27	RF	1320		95	1	.7		
	2800	OTTA	24	R	1320	1340	20	1	.5		
	2800	OTTA	24P	R	1340		42	1			
	2800	OTTA	26	FAL	1422	1455	33	-1	-0.5		
	2800	OTTA	20	GRF	1500	1655	155	1.4	.7		
7	260	ONDR	44	NS	0610 E		532 D	13			
	8800	ATHN	2	GRF	0841.2	0846.4	5.8	18.3	11		
	2000	TYKW	5	S	2310	2310.3	1	2.7	.7		OR
8	1400	SYDN	40	F	0344.2	0346.3	3.5				
	5730	IRKU	2	S	0344.8	0345.3	3	17	5		
	9400	TYKW	5	S	0345.5	0346.6	3	7	2		OL
	1000	TYKW	45	C	0345.5	0346.4	2	7	1.7		
	3750	TYKW	45	C	0345.5	0346.3	2	23	8		OL
	1415	MANI	3		0345.5	0346.2	2.3	2.9	.6		
	4995	MANI	3		0345.5	0346.2	2	23.6	7.9		
	2695	MANI	3		0345.5	0346.5	2	16.2	7.5		
	4995	ATHN	3	S/F	0345.7	0346.9	4.2	25.7	7.7		
	700	SYDN	40	F	0346.3	0346.5	.7				
	2695	BOUL	45	C	1713.5	1716	5	35	12		
	4995	BOUL	45	C	1714.5	1715	3.5	35	12		
9	500	HIRA	45	C	2031	2034	6.5	10	4		O
	200	HIRA	45	C	2033	2036	16	23	5		O
	100	HIRA	45	C	2035	2037.7	15	260	80		O
10	100	HIRA	45	C	0251		15		60		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

JULY 1977

JUL 1977	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	POLARIZATION OR REMARKS
	100	HIRA			0251	0253		100			O
	100	HIRA			0251	0258		200			O
	100	HIRA			0251	0302.3		100			O
	500	HIRA	45	C	0309.2	0317	11	10	5		WR
	200	HIRA	45	C	0318	0318.7	3	5	2		SR
	3100	CRIM	24	R	0957	1041		5			
11	245	SGMR	6	S	1729.6	1730.2	1	204	61.2		
	606	SGMR	1	S	1729.8	1729.9	.2	4.7	1.4		
	410	SGMR	6	S	1730.1	1730.4	.5	40	12		
	245	SGMR	6	S	1737.5	1737.8	.7	220	65.9		
	410	SGMR	6	S	1737.7	1737.8	.3	41.4	12.4		
	2695	SGMR	3	S	2012.6	2012.8	.6	40	12		
12	536	ONDR	8	S	1319.2	1319.2	.3	88			
	2800	OTTA	20	GRF	1725	1735	30	.8	.4		
13	2695	PENT	20	GRF	0014	0025	45	1.2	.6		
	237	TRST	41	F	1040.4	1040.5	3.4	59			L
	2695	BOUL	45	C	1611	1612.5	4.5	4	1		
14	18	HOHA	6	S	1403	1405	2			1	
	2695	BOUL	40	F	1802	1804	6	12	4		
	2695	BOUL	8	S	2015.5	2016	1.5	10	3		
16	536	ONDR	3	S	1333.2	1333.2	.2	17			
	536	ONDR	4	S/F	1506	1506.6	.6	21			
	100	HIRA	45	C	2237	2237.7	1	780	300		SL
17	536	ONDR	8	S	1004.6	1004.8	.3	58			
18	260	ONDR	4	S/F	0956.2	0956.7	1.2	11	2		
19	2695	PENT	21	GRF	2250	2357	120	15.6			
	1400	SYDN	20	GRF	2251.5	2304.1	19.3				
	3750	TYKW	21	GRF	2255	2350	360	12	4		OR
	9400	TYKW	20	GRF	2255	2350	240	12	6		OR
	1000	TYKW	5	S	2255	2304	20	5	2.5		
	2000	TYKW	21	GRF	2255	2355	300	9	4		OL
	1415	HANI	2		2258	2303.2	13.6	12.6	5.7		
	2000	TYKW	5	S	2258	2304	15	9	4		OL
	2695	PENT	20	GRF	2259	2304	16	6.4	3		
	3750	TYKW	5	S	2301	2304	12	2.5	1		OR
	1000	TYKW	45	C	2315	2326	55	3	.8		
	35000	NAGO	20	GRF	2345	2358	45	14			
20	260	ONDR	8	S	0824.7	0824.7	.3	18			
21	3100	CRIM	24	R	1039	1300		5			
	245	SGMR	43	NS	1756	2027.3	374 D	24			
22	3100	CRIM	24	R	1210	1227		5			
	2800	OTTA	240	R	1815	2100	165	3	1.5		
	2695	BOUL	45	C	2212.5	2214	4.5	57	15		
	4995	BOUL	45	C	2214.5	2216	4	130	24		
23	260	ONDR	40	F	0751.5	0755.3	11	3.5	2		
	2800	OTTA	240	R	2020	2100	40	1.2	.6		
	2800	OTTA	20	GRF	2220	2245	90	.8	.4		
	500	HIRA	45	C	2318	2322	7	12	5		ML
25	1420	ARCE	2		1621.9	1622.2	.5				
	1420	ARCE	2		1624.2	1624.6	.6				
	207	VORO	4	S/F	2353	2353.6	1	30			
26	1420	BOUL	45	C	0113	0114	3.5	3	1		
	2695	BOUL	45	C	0114.5	0118	5	4	1		
	1420	BOUL	3	S	0123	0124	2.5	2	1		
	2695	BOUL	3	S	0124.5	0125	2.5	4	1		
	1000	TYKW	45	C	0315	0316.8	3	3.5	1.1		
	2800	OTTA	20	GRF	1740	1835	95	1.2	.8		
27	1420	ARCE	40		1341.6	1342.4	13				
	9100	ARCE	40		1341.7	1346.3	13.5				
28	9100	ARCE	1		0925.8	0926	.7				
	9100	ARCE	41		0925.8	0946.8	23.2				
	9100	ARCE	1		0932.7	0933.2	1				
	9100	ARCE	1		0942.5	0943.5	2				
	9100	ARCE	3		0945.5	0946.8	3.5				
	2800	OTTA	240	R	1500	1520	20	1.2	.6		
	245	SGMR	43	NS	1804.2	2107.2	358.8D	11.1			3
29	1420	ARCE	20		1116.9	1201.7	86				
	9100	ARCE	24		1128.8		78				

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

JULY 1977

JUL 1977	FREQUENCY STATION	TYPE	STARTING TIME	TIME OF MAXIMUM	DURATION	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1}		INT	POLARIZATION OR REMARKS
			UT	UT	MINUTES	PEAK	MEAN		
31	1420 ARCE	8	1008.4	1008.5	.4				

Reports received from the following observatories:

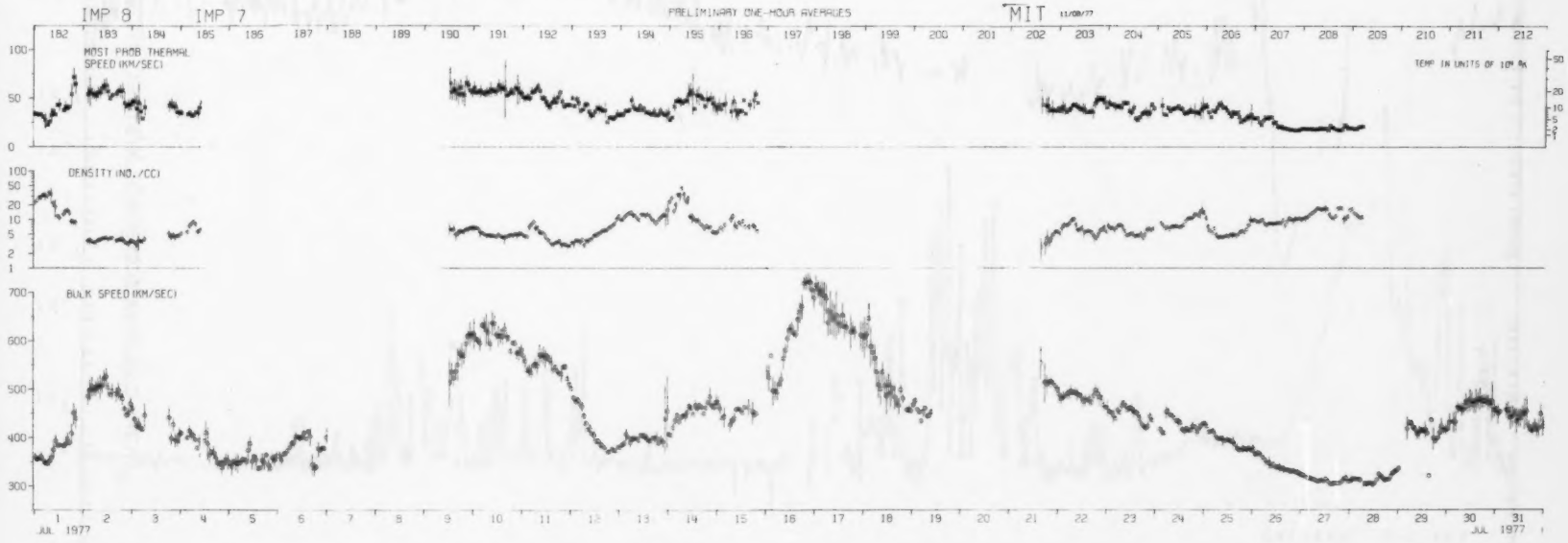
ARCE = Arcetri
BERL = Berlin-Adlershof
BORD = Bordeaux
BOUL = Boulder
CRIM = Simferopol
DWIN = Dwingeloo
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
NAGO = Nagoya
ONDR = Ondrejov
OTTA = Ottawa
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
VORO = Voroshilov (Ussurisk)

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

IMP 7 AND 8 SOLAR WIND PLASMA

JULY 1977

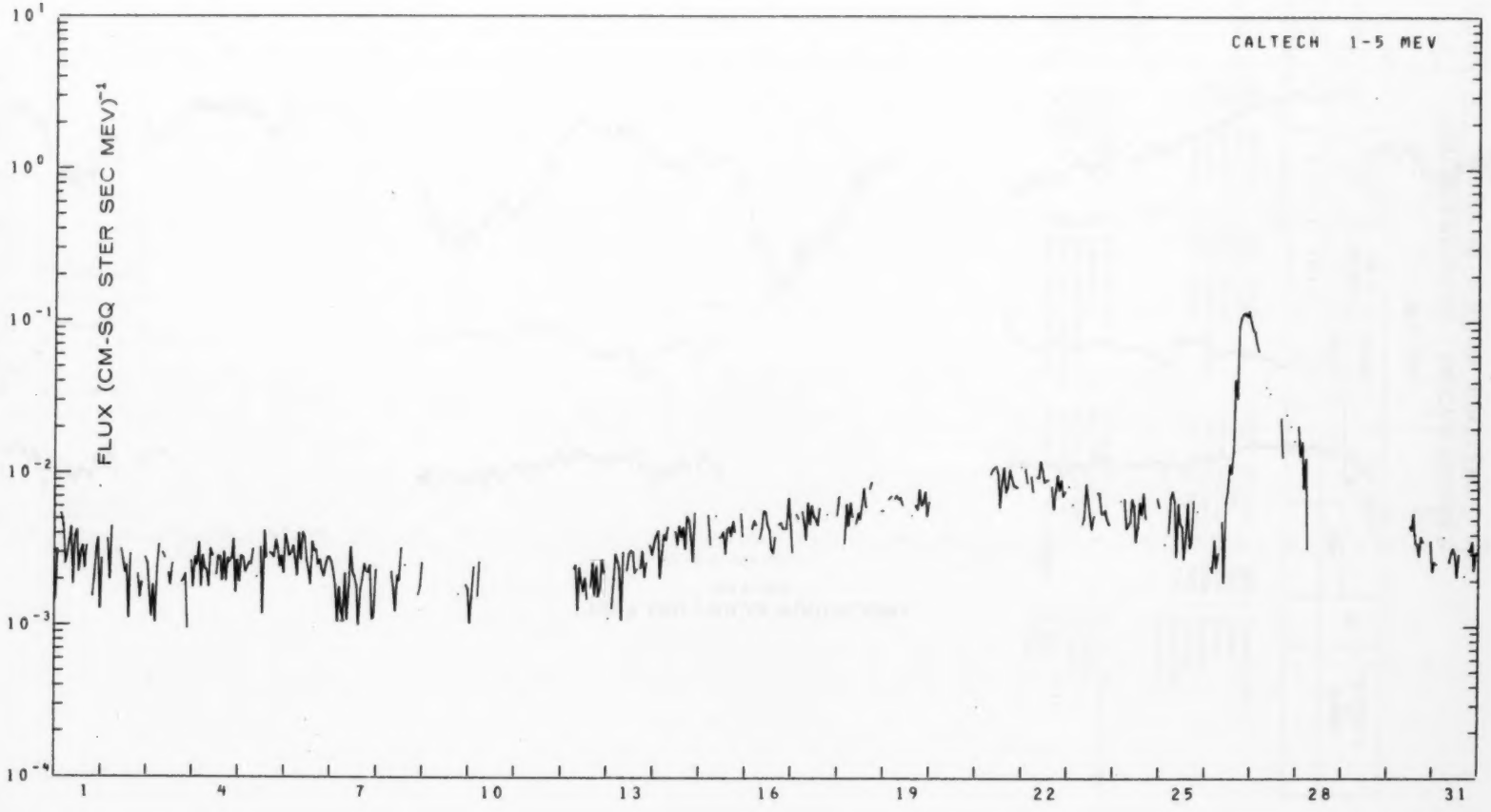


19
Jul 77

IMP 7 AND 8 ELECTRONS

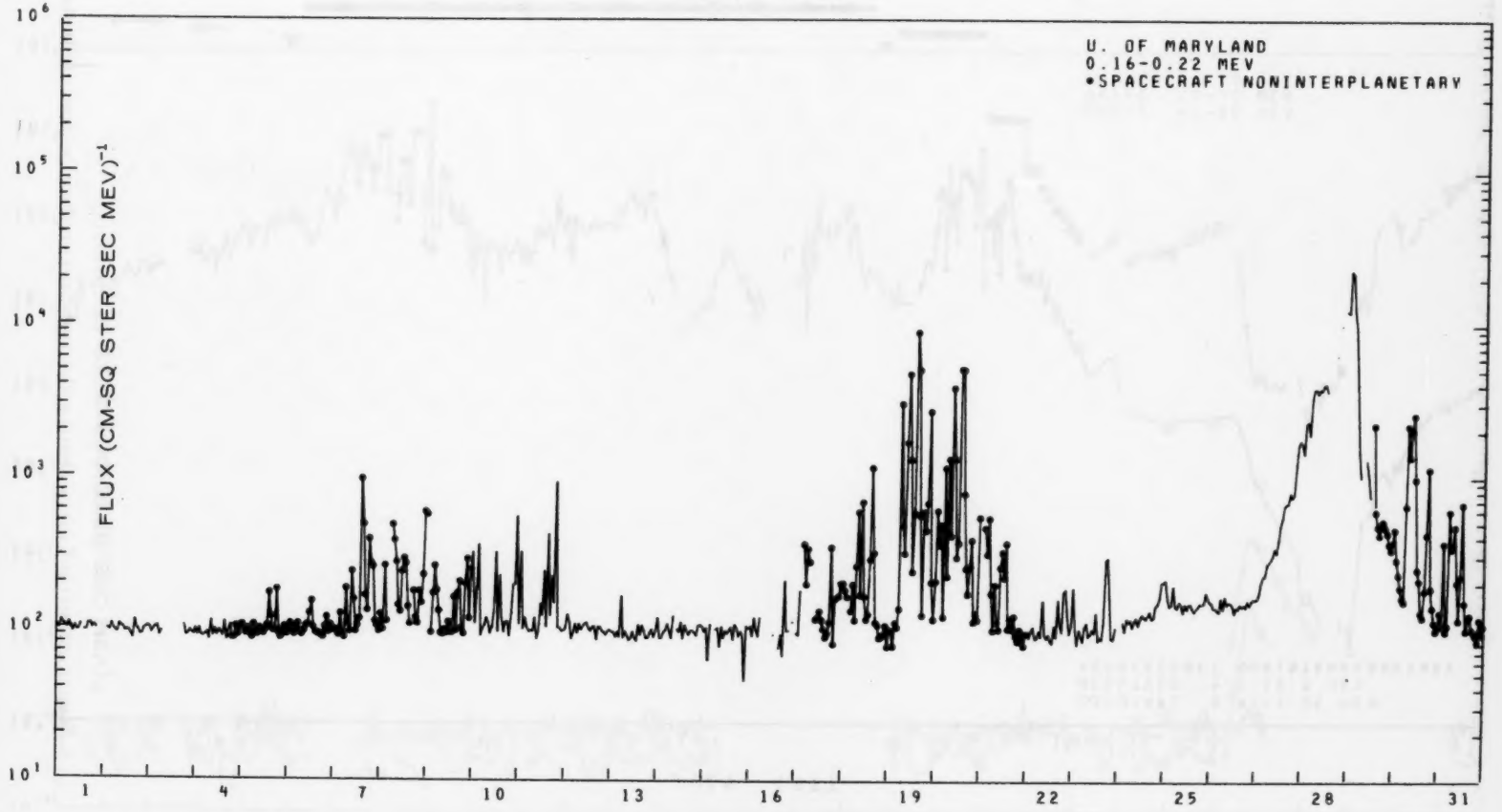
JULY. 1977

20 Jul 77



IMP 7 AND 8 LOW ENERGY PROTONS

JULY, 1977



21 Jul 77

IMP 7 AND 8 INTERMEDIATE ENERGY PROTONS

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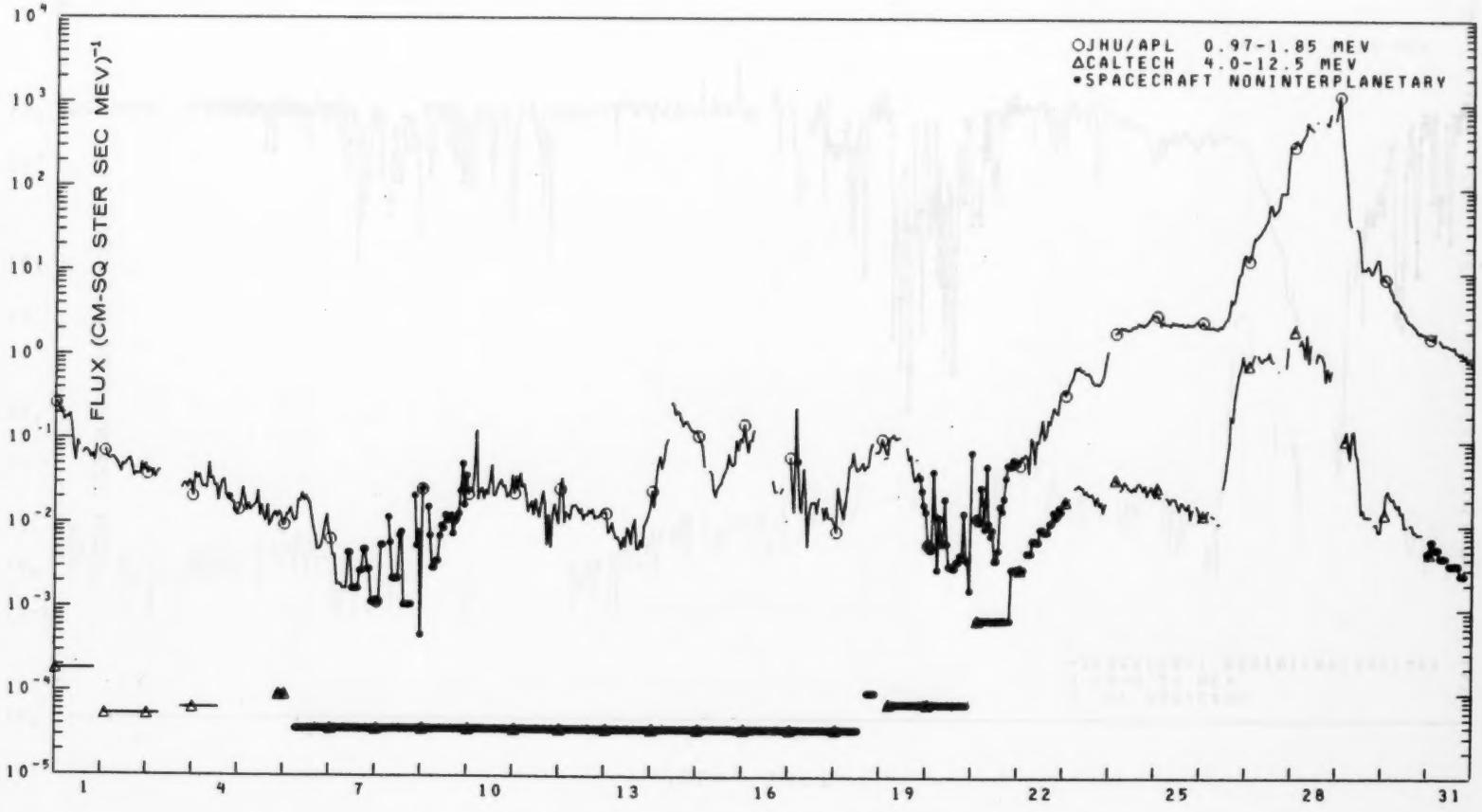
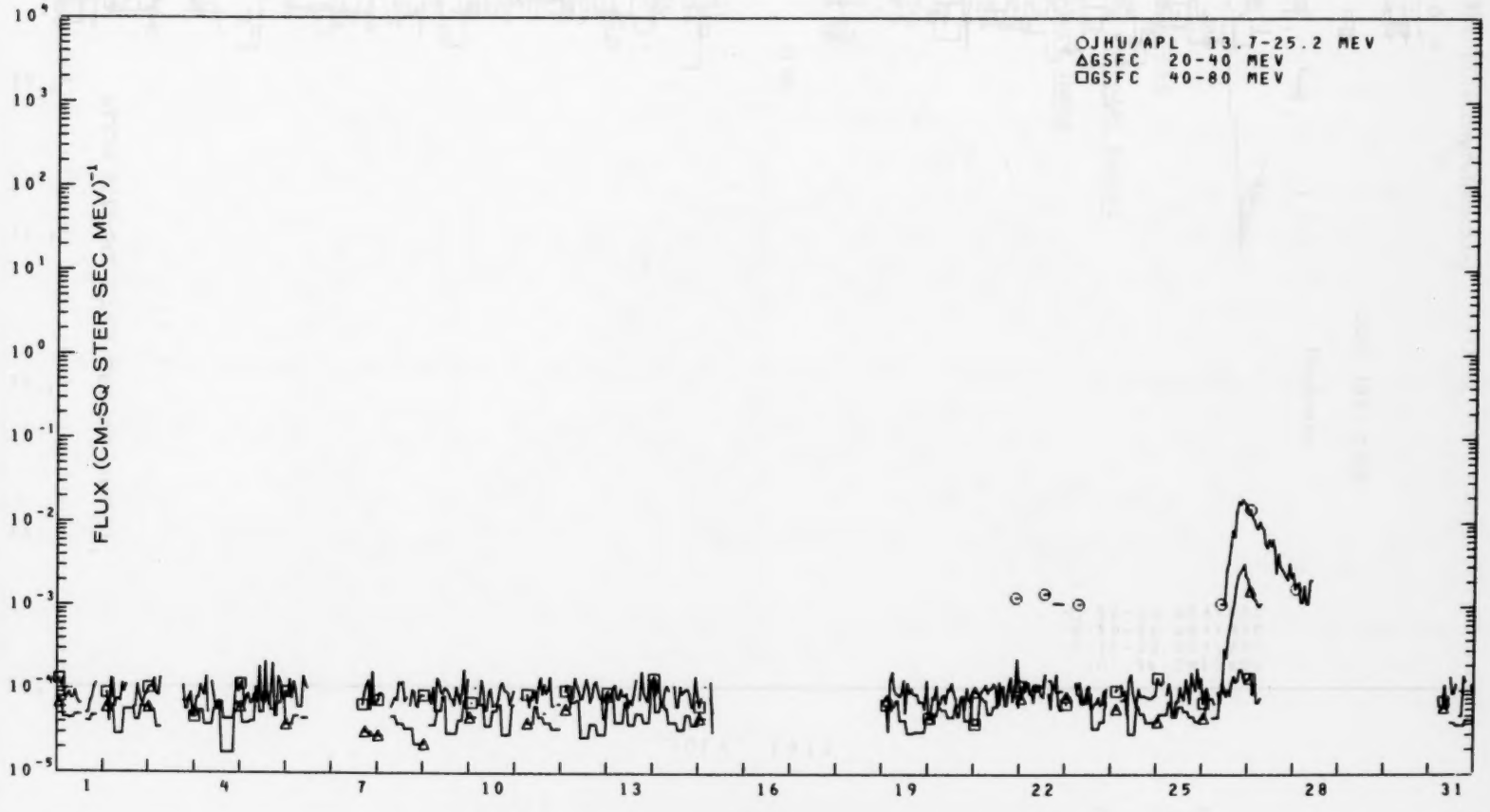


IMP 7 AND 8 HIGH ENERGY PROTONS

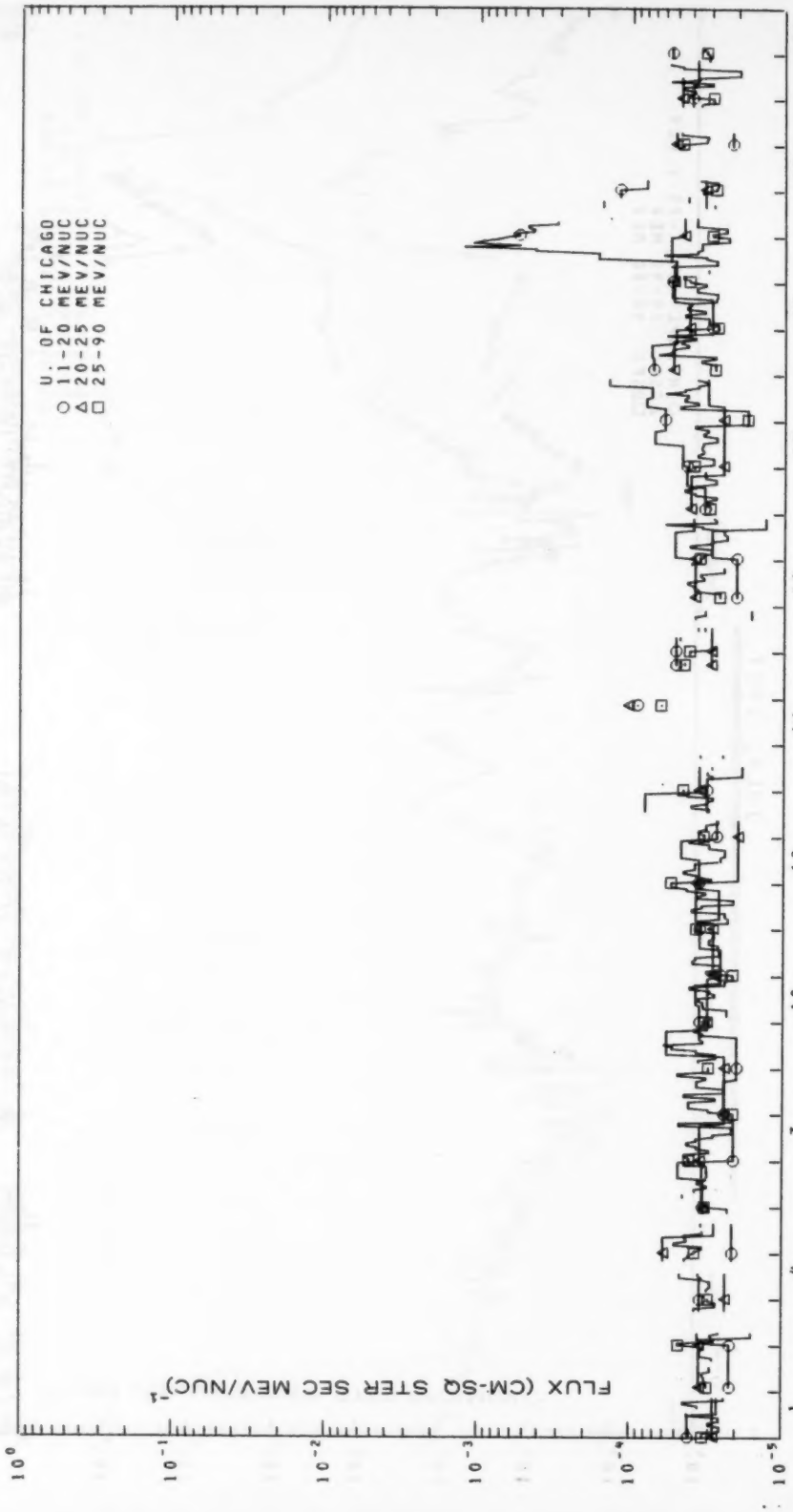
JULY, 1977



23 Jul 77

IMP 7 AND 8 ALPHA PARTICLES

JULY, 1977



JUNE 1977 DATA

Contents

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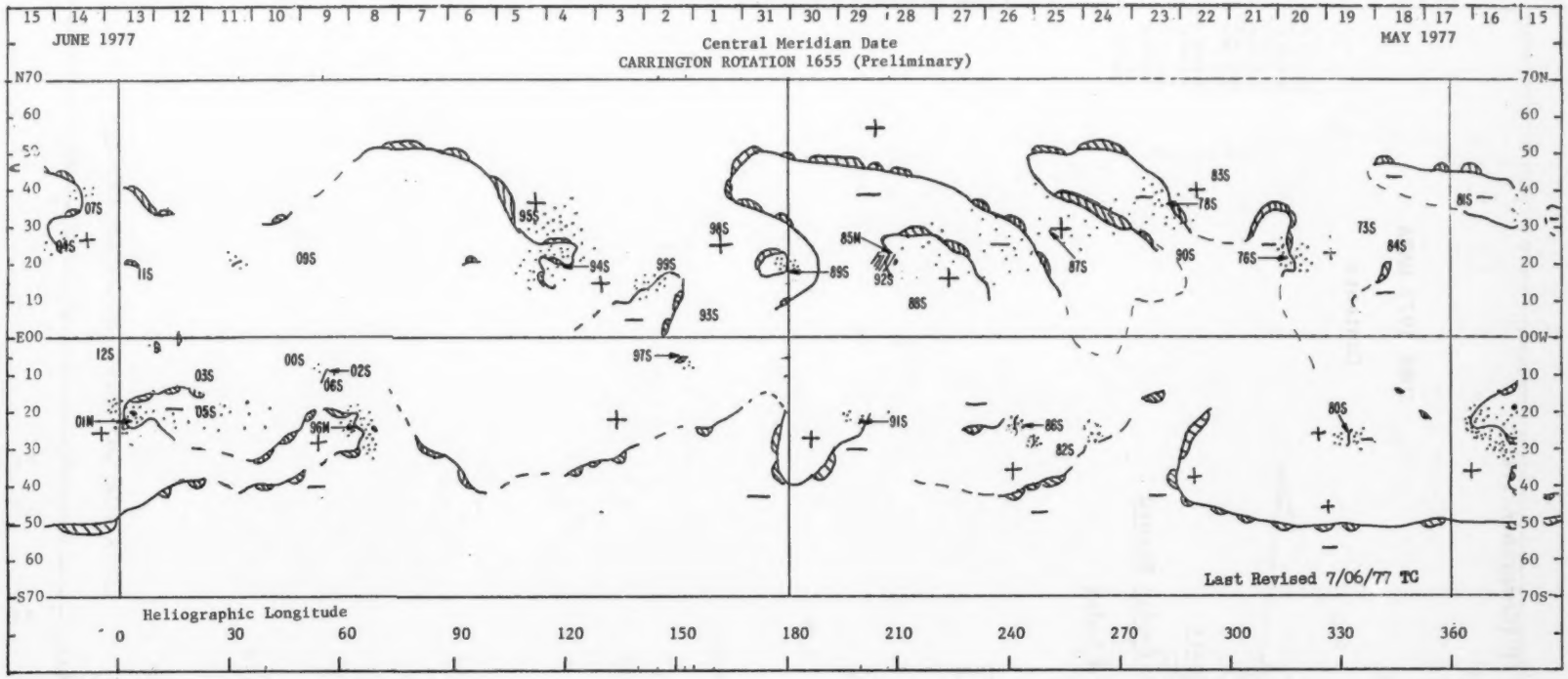
Abbreviated Calendar Record	28-35
Regional Flare Index	35

ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

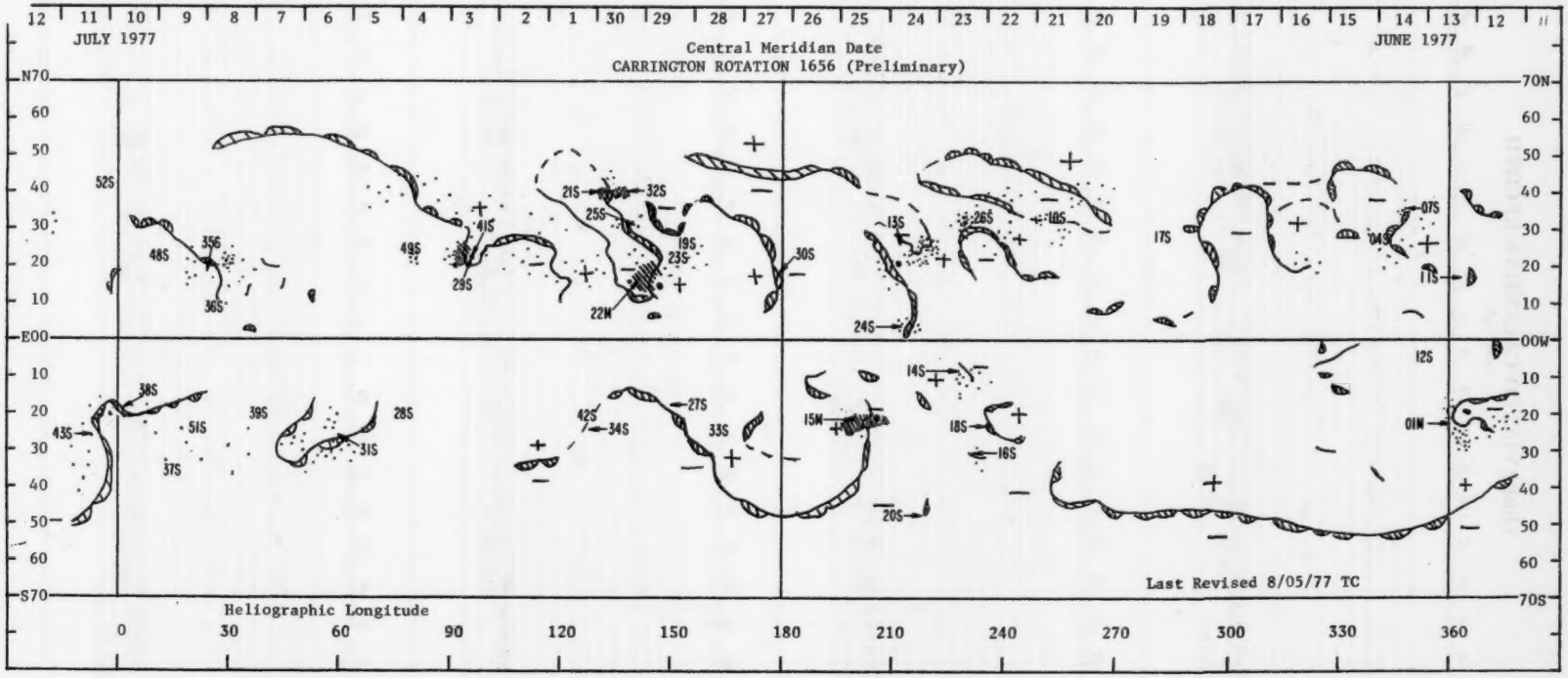
MAY - JUNE 1977



ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

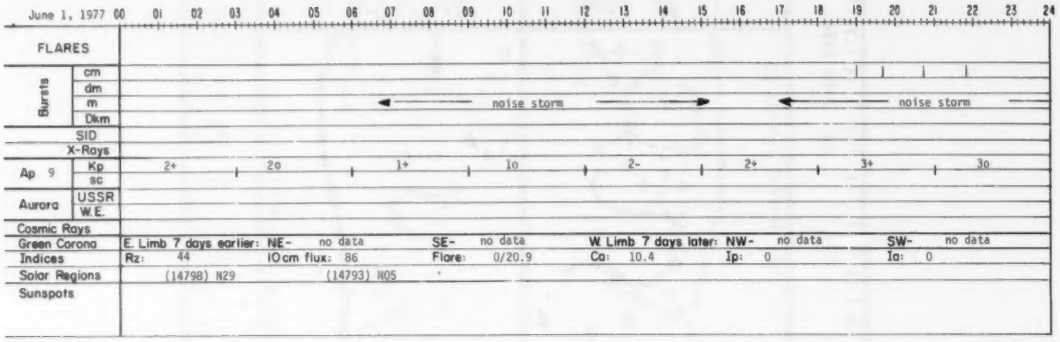
JUNE 1977 - JULY 1977

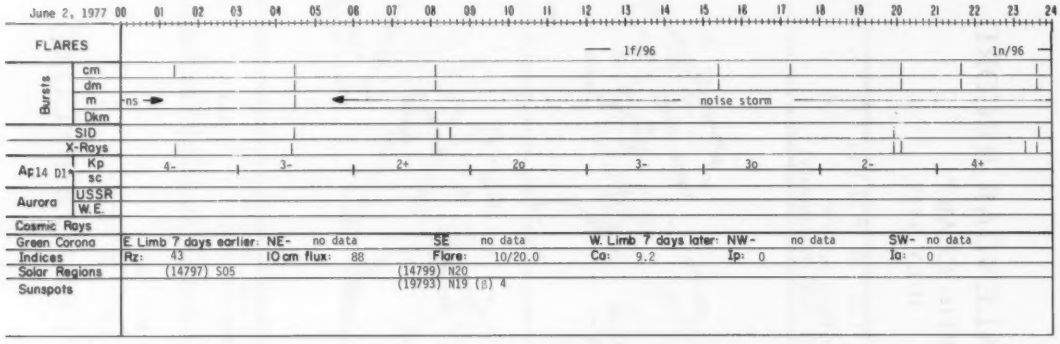


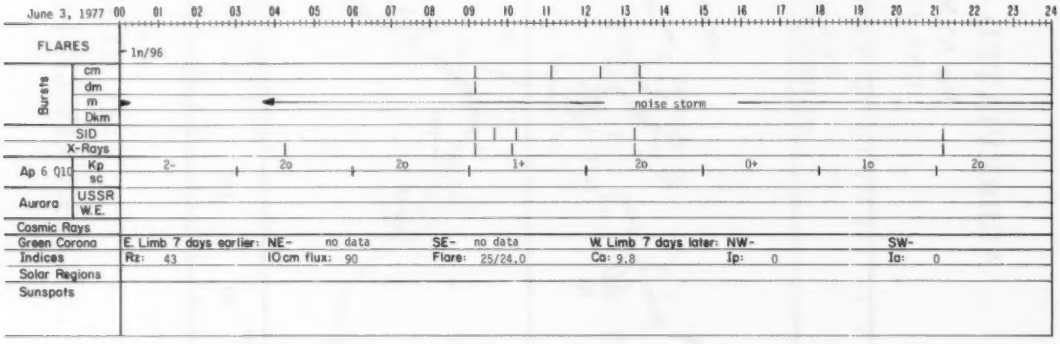
27
Jun 77

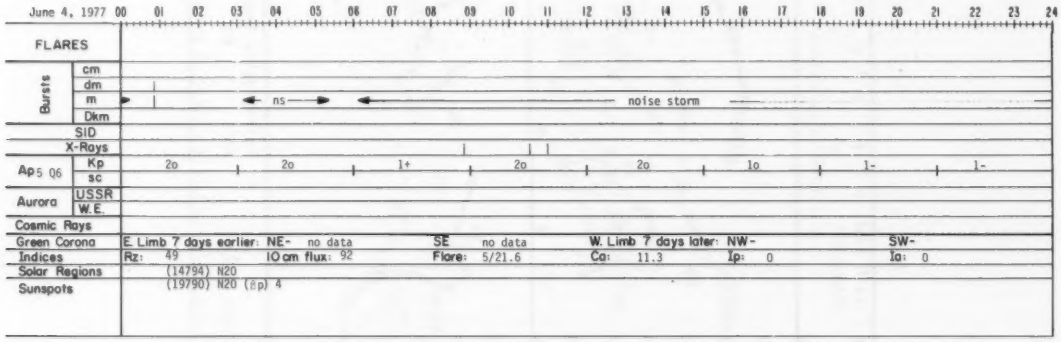
ABBREVIATED CALENDAR RECORD

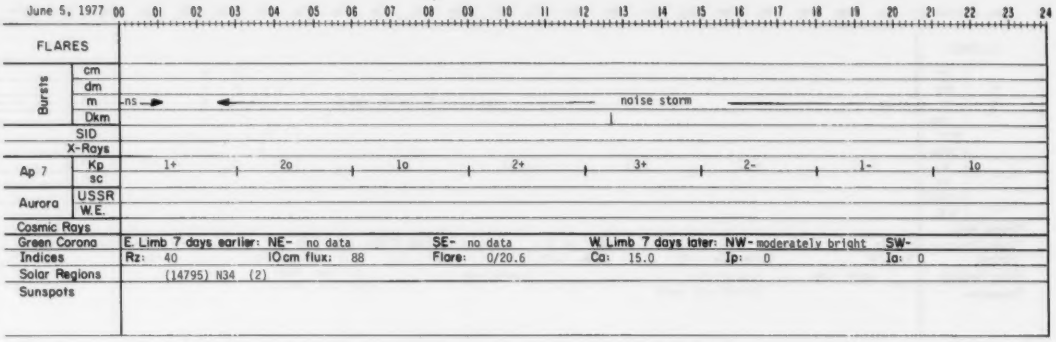
JUNE 1977

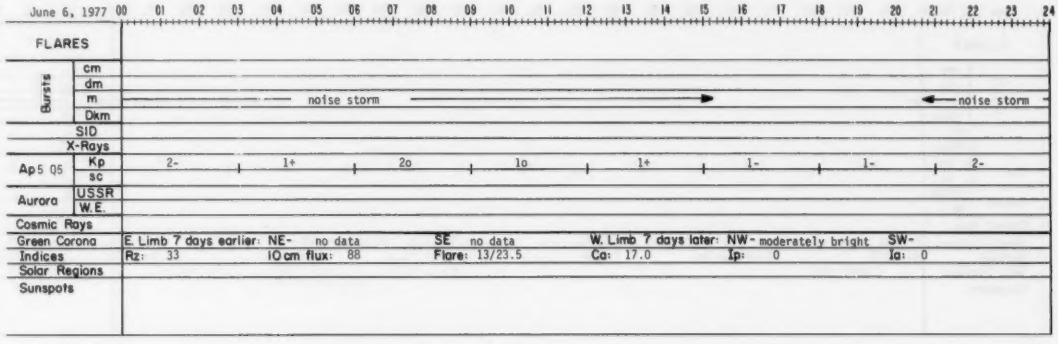


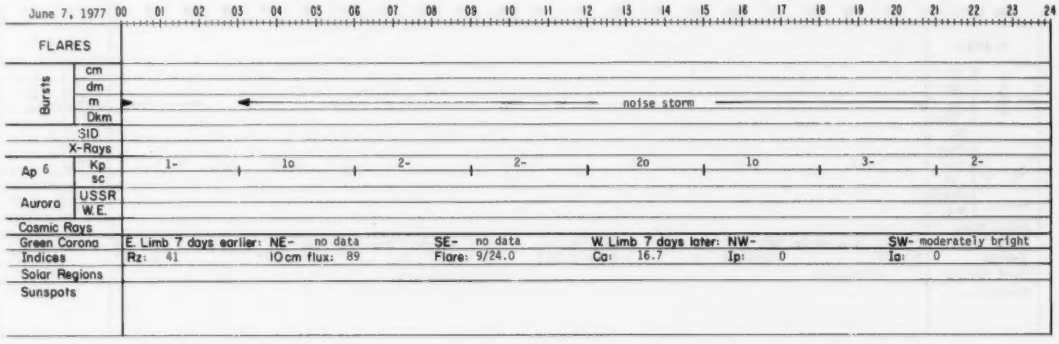


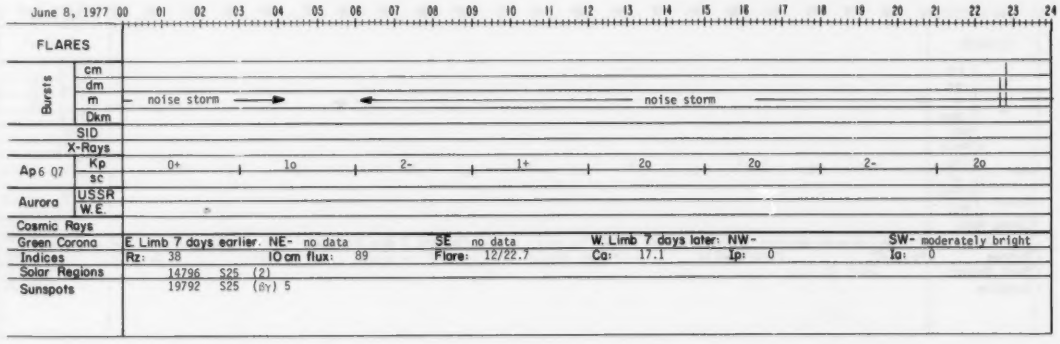


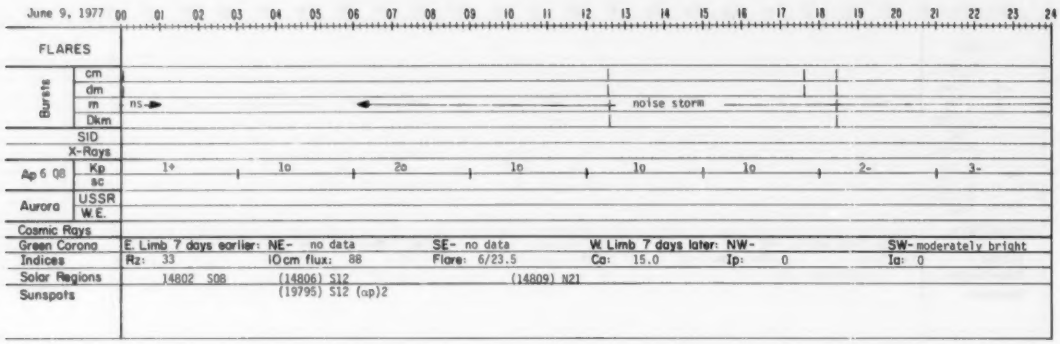


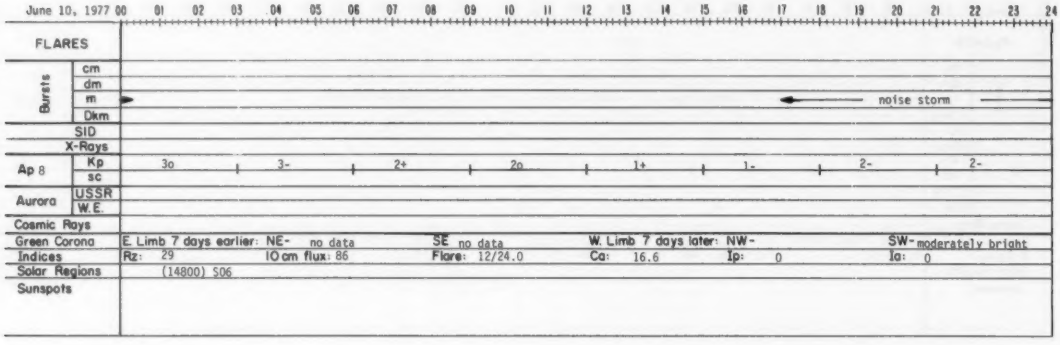

June 5, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
-ns
noise storm
SID
X-Rays
Ap 7
Kp
sc
1+ 2o 1o 2+ 3+ 2- 1- 1o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- moderately bright SW-
Indices
Rz: 40 10cm flux: 88 Flare: 0/20.6 Ca: 15.0 Ip: 0 Ia: 0
Solar Regions
(14795) N34 (2)
Sunspots

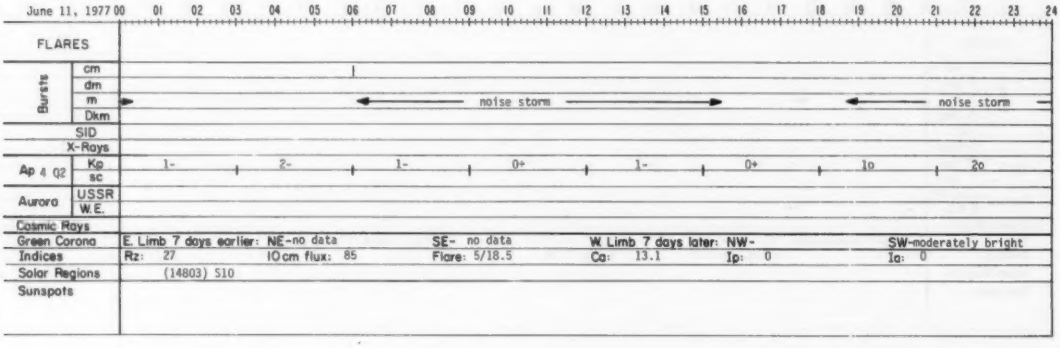

June 6, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
noise storm
SID
X-Rays
Ap 5 Q5
Kp
sc
2- 1+ 2o 1o 1+ 1- 1- 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- moderately bright SW-
Indices
Rz: 33 10cm flux: 88 Flare: 13/23.5 Ca: 17.0 Ip: 0 Ia: 0
Solar Regions
Sunspots

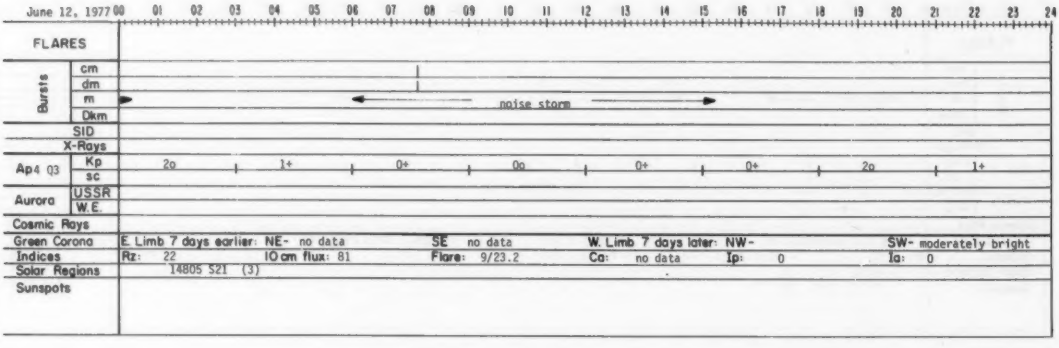

June 7, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 6
Kp
sc
1- 1o 2- 2- 2o 1o 3- 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- moderately bright
Indices
Rz: 41 10cm flux: 89 Flare: 9/24.0 Ca: 16.7 Ip: 0 Ia: 0
Solar Regions
Sunspots


June 8, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
noise storm
SID
X-Rays
Ap 6 Q7
Kp
sc
0+ 1o 2- 1+ 2o 2o 2- 2o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW- moderately bright
Indices
Rz: 38 10cm flux: 89 Flare: 12/22.7 Ca: 17.1 Ip: 0 Ia: 0
Solar Regions
14796 S25 (2)
Sunspots
19792 S25 (BY) 5


June 9, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
ns
noise storm
SID
X-Rays
Ap 6 Q8
Kp
sc
1+ 1o 2o 1o 1o 1o 2- 3-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- moderately bright
Indices
Rz: 33 IOcm flux: 88 Flare: 6/23.5 Ca: 15.0 Ip: 0 Ia: 0
Solar Regions
14802 S08 (14806) S12 (14809) N21
Sunspots
(19795) S12 (ap)2


June 10, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 8
Kp
sc
3o 3- 2+ 2o 1+ 1- 2- 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW- moderately bright
Indices
Rz: 29 IOcm flux: 86 Flare: 12/24.0 Ca: 16.6 Ip: 0 Ia: 0
Solar Regions
(14800) S06
Sunspots


June 11, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
noise storm
SID
X-Rays
Ap 4 Q2
Kp
sc
1- 2- 1- 0+ 1- 0+ 1o 2o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE-no data SE- no data W. Limb 7 days later: NW- SW-moderately bright
Indices
Rz: 27 IOcm flux: 85 Flare: 5/18.5 Ca: 13.1 Ip: 0 Ia: 0
Solar Regions
(14803) S10
Sunspots


June 12, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap4 Q3
Kp
sc
2o 1+ 0+ 0o 0+ 0+ 2o 1+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW- moderately bright
Indices
Rz: 22 IOcm flux: 81 Flare: 9/23.2 Ca: no data Ip: 0 Ia: 0
Solar Regions
14805 S21 (3)
Sunspots

June 13, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm | dm | m — noise storm → | Dkm

SID

X-Rays

Ap 6 — Kp: 1+ 2- 1+ 1- 1o 1o 2o 3o — sc

Aurora: USSR | W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW- no data; SW- no data

Indices — Rz: 20; 10cm flux: 82; Flare: 16/19.3; Ca: 10.4; Ip: 0; Ia: 0

Solar Regions — (14811) N17; 14801 S23 (3); 19794 SZI (βδ)5

Sunspots

June 14, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm | dm | m | Dkm

SID

X-Rays

Ap 9 — Kp: 4o 3- 2o 1+ 1+ 1- 2- 2o — sc

Aurora: USSR | W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data; SE no data; W. Limb 7 days later: NW- no data; SW- no data

Indices — Rz: 25; 10cm flux: 80; Flare: 0/22.3; Ca: 8.0; Ip: 0; Ia: 0

Solar Regions — (14812) S05; 14807 N35; (14804) N26; 19796 N34 (β)2

Sunspots

June 15, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm | dm | m | Dkm

SID

X-Rays

Ap 3 Q1 — Kp: 1- 1+ 1- 0+ 0+ 0+ 1+ 1+ — sc

Aurora: USSR | W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW- no data; SW- no data

Indices — Rz: 8; 10cm flux: 80; Flare: 9/24.0; Ca: 6.8; Ip: 0; Ia: 0

Solar Regions

Sunspots

June 16, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm | dm | m | Dkm

SID

X-Rays

Ap 10 — Kp: 2- 1+ 1o 1+ 3o 4- 3- 2o — sc

Aurora: USSR | W.E.

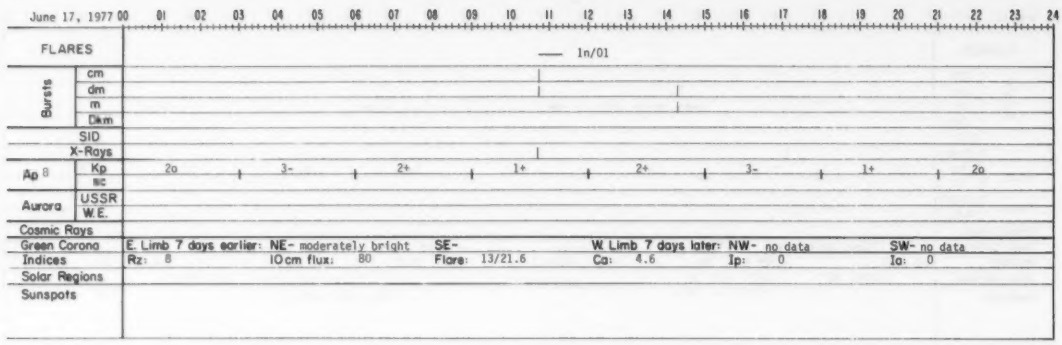
Cosmic Rays

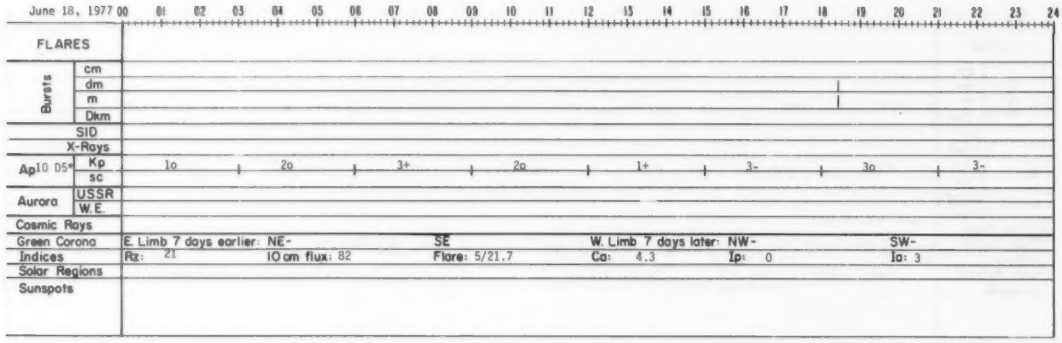
Green Corona — E. Limb 7 days earlier: NE- no data; SE no data; W. Limb 7 days later: NW- no data; SW- no data

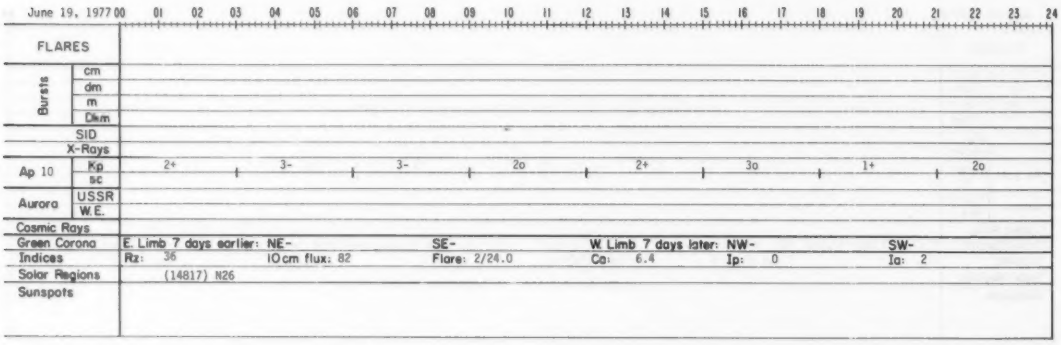
Indices — Rz: 8; 10cm flux: 79; Flare: 0/23.3; Ca: 5.4; Ip: 0; Ia: 0

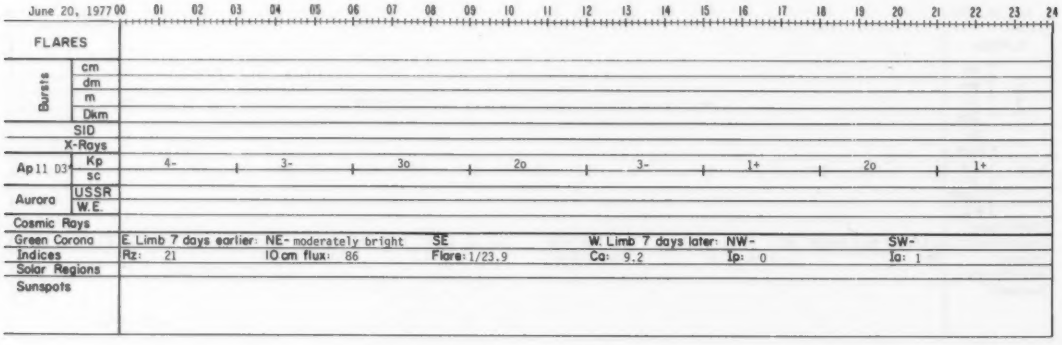
Solar Regions

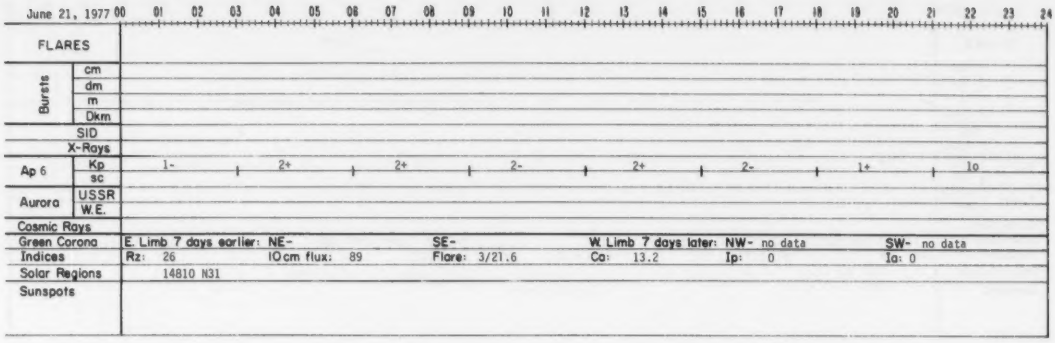
Sunspots

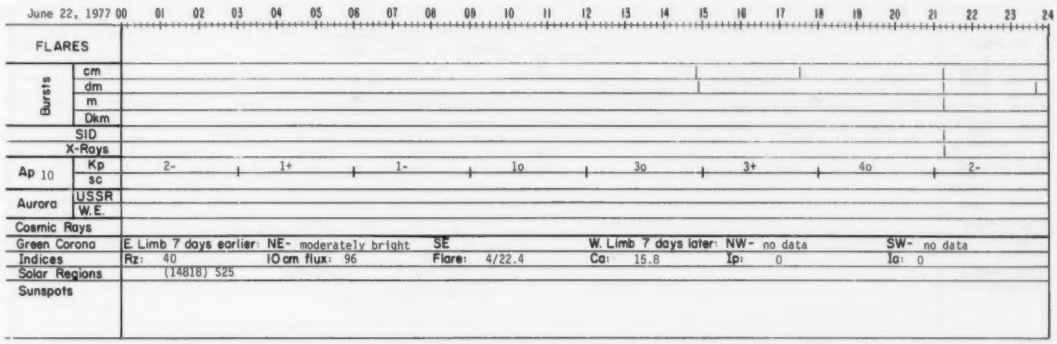

June 17, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/01
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 8
Kp
sc
2o 3- 2+ 1+ 2+ 3- 1+ 2o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE- W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 8 10 cm flux: 80 Flare: 13/21.6 Ca: 4.6 Ip: 0 Ia: 0
Solar Regions
Sunspots

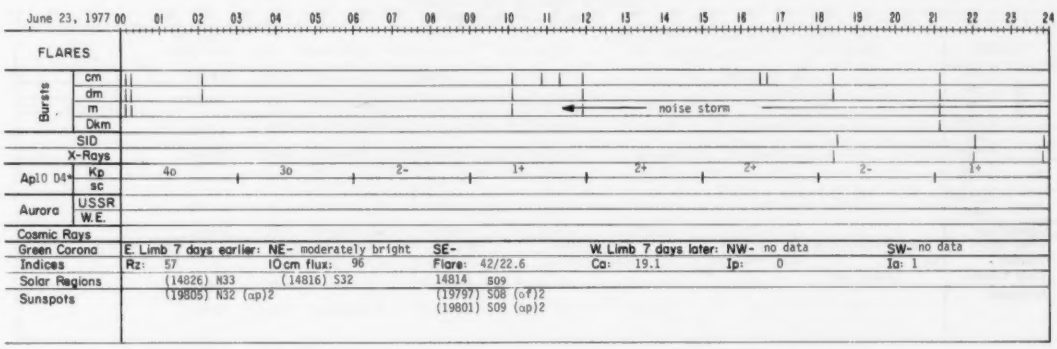

June 18, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap10 D5*
Kp
sc
1o 2o 3+ 2o 1+ 3- 3o 3-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW-
Indices
Rz: 21 10 cm flux: 82 Flare: 5/21.7 Ca: 4.3 Ip: 0 Ia: 3
Solar Regions
Sunspots

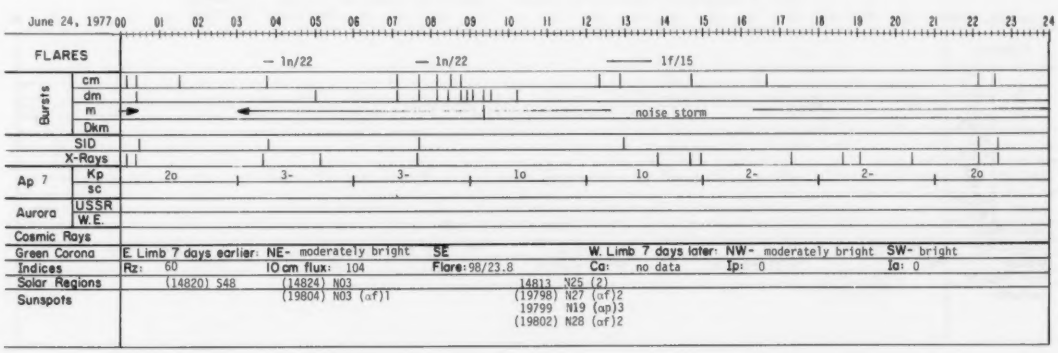

June 19, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 10
Kp
sc
2+ 3- 3- 2o 2+ 3o 1+ 2o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- SW-
Indices
Rz: 36 10 cm flux: 82 Flare: 2/24.0 Ca: 6.4 Ip: 0 Ia: 2
Solar Regions
(14817) N26
Sunspots

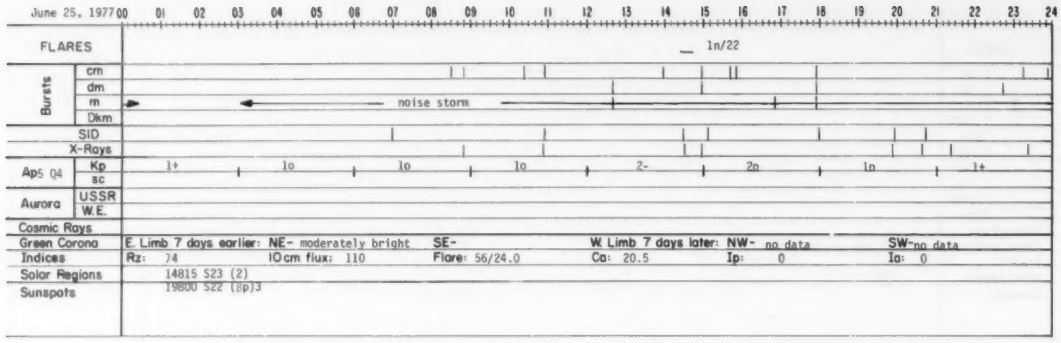

June 20, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap11 D3*
Kp
sc
4- 3- 3o 2o 3- 1+ 2o 1+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- SW-
Indices
Rz: 21 10 cm flux: 86 Flare: 1/23.9 Ca: 9.2 Ip: 0 Ia: 1
Solar Regions
Sunspots

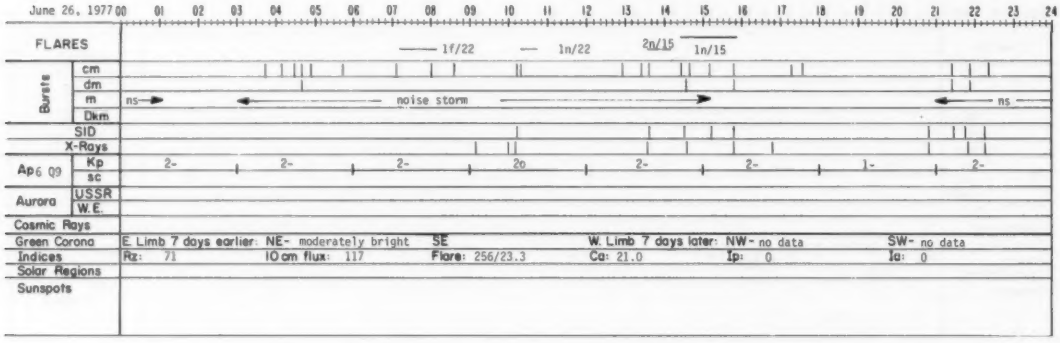

June 21, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 6
Kp
sc
1- 2+ 2+ 2- 2+ 2- 1+ 1o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 26 10cm flux: 89 Flare: 3/21.6 Ca: 13.2 Ip: 0 Ia: 0
Solar Regions
14810 N31
Sunspots

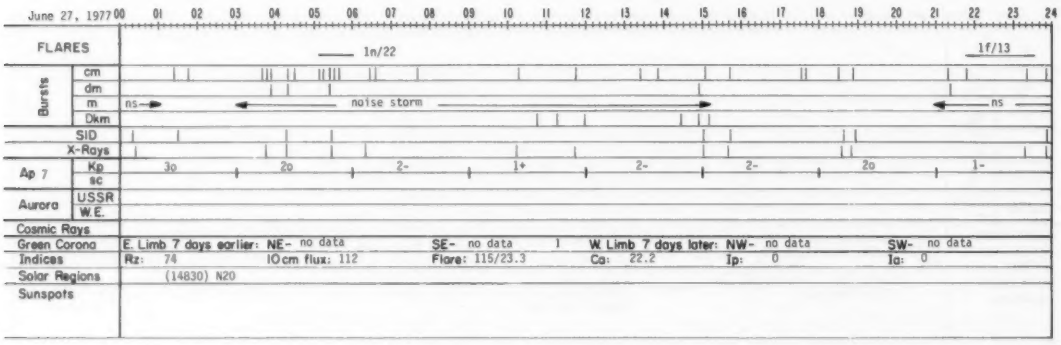

June 22, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 10
Kp
sc
2- 1+ 1- 1o 3o 3+ 4o 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 40 10cm flux: 96 Flare: 4/22.4 Ca: 15.8 Ip: 0 Ia: 0
Solar Regions
(14818) S25
Sunspots

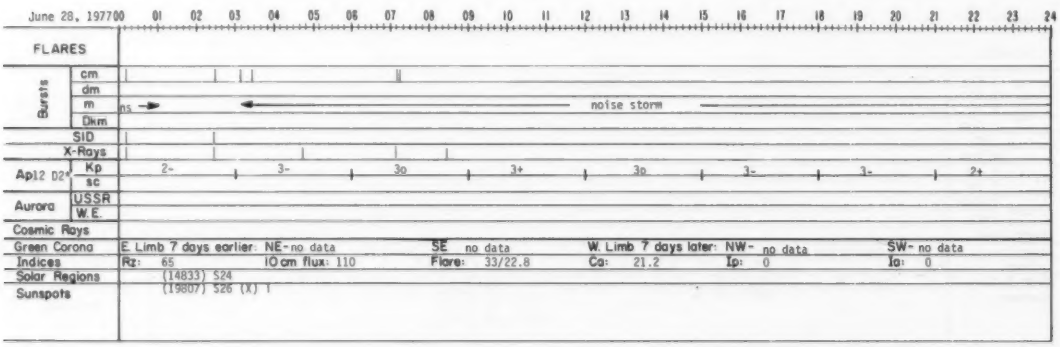

June 23, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
noise storm
Dkm
SID
X-Rays
Ap10 D4
Kp
sc
4o 3o 2- 1+ 2+ 2+ 2- 1+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE- W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 57 10cm flux: 96 Flare: 42/22.6 Ca: 19.1 Ip: 0 Ia: 1
Solar Regions
(14826) N33 (14816) S32 14814 S09
Sunspots
(19805) N32 (ap)2 (19797) S08 (of)2
(19801) S09 (ap)2

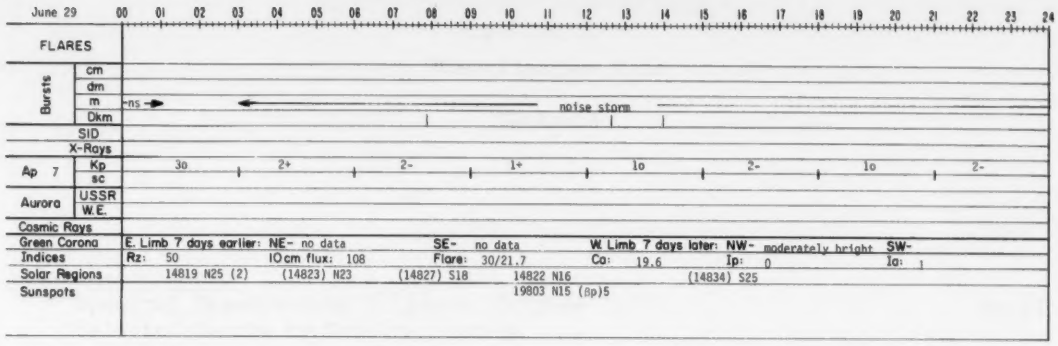

June 24, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/22
1n/22
1f/15
Bursts
cm
dm
m
noise storm
Dkm
SID
X-Rays
Ap 7
Kp
sc
2o 3- 3- 1o 1o 2- 2- 2o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- moderately bright SW- bright
Indices
Rz: 60 10cm flux: 104 Flare: 98/23.8 Ca: no data Ip: 0 Ia: 0
Solar Regions
(14820) S48 (14824) N03 14813 N25 (2)
Sunspots
(19804) N03 (af)1 (19798) N27 (af)2
19799 N19 (ap)3
(19802) N28 (af)2

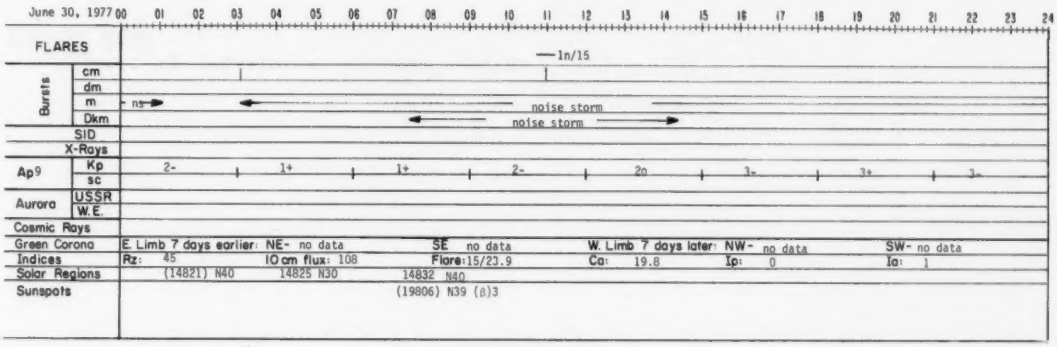

June 25, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/22
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap5 Q4
Kp
sc
1+ 1o 1o 1o 2- 2o 1n 1+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE- W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 74 10cm flux: 110 Flare: 56/24.0 Ca: 20.5 Ip: 0 Ia: 0
Solar Regions
14815 S23 (2)
Sunspots
19800 S22 (Ep)3


June 26, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1f/22
1n/22
2n/15
1n/15
Bursts
cm
dm
m
Dkm
ns
noise storm
ns
SID
X-Rays
Ap6 Q9
Kp
sc
2- 2- 2- 2o 2- 2- 1- 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 71 10cm flux: 117 Flare: 256/23.3 Ca: 21.0 Ip: 0 Ia: 0
Solar Regions
Sunspots


June 27, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/22
1f/13
Bursts
cm
dm
m
Dkm
ns
noise storm
ns
SID
X-Rays
Ap 7
Kp
sc
3o 2o 2- 1+ 2- 2- 2o 1-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 74 10cm flux: 112 Flare: 115/23.3 Ca: 22.2 Ip: 0 Ia: 0
Solar Regions
(14830) N20
Sunspots


June 28, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
ns
noise storm
SID
X-Rays
Ap12 D2
Kp
sc
2- 3- 3o 3+ 3o 3- 3- 2+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 65 10cm flux: 110 Flare: 33/22.8 Ca: 21.2 Ip: 0 Ia: 0
Solar Regions
(14833) S24
Sunspots
(19807) S26 (X) 1





REGIONAL FLARE INDEX

INCLUDES ALL FLARES

MC MATH PLAGE NO.	LAT	CMP DATE	DATE FIRST FLARE	DATE LAST FLARE	*FLARE-INDEX SUM	FLARE-INDEX MEAN	TOTAL NO. OF FLARES
14799	N20	77/06/02.6	77/06/06	77/06/07	3.62	1.81	3
14794	N20	77/06/04.6	77/05/29	77/06/06	28.71	3.19	13
14796	S25	77/06/08.8	77/06/02	77/06/12	48.15	4.38	23
14801	S23	77/06/13.4	77/06/02	77/06/18	64.36	5.85	20
14814	S 9	77/06/23.5	77/06/17	77/05/17	.88	.88	1
14813	N25	77/06/24.7	77/06/17	77/06/29	51.93	3.99	12
14815	S23	77/06/25.5	77/06/19	77/07/01	350.06	25.00	53
14819	N25	77/06/29.2	77/06/24	77/06/24	1.90	1.90	1
14822	N16	77/06/23.9	77/06/22	77/07/06	296.62	19.11	98
14832	N40	77/06/30.7	77/07/02	77/07/07	21.45	3.51	15

Note:
Because of differences in method of calculation, the dates of Central Meridian Passage for the McMath Plage Regions vary somewhat from those given elsewhere. Any region not listed here produced no flares during its disk passage.

Miscellaneous Data

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SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

OCTOBER 1977

OCT 1977	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
01	0000	0722	CULG	0143	0143.5		0143	0143.5					IIIG,W
			CULG	0144		1							IIIB
			CULG	0146.5	0147								IIIG,W
			CULG	0558.5	0559		0558.5	0559					IIIG,W
	2022	2400	CULG	2022	2246								IS,W
			CULG				2034.5	2254					IIIN,W
			CULG	2204			2204						IIIB,W
			CULG	2307.5	2308.5		2307.5	2308.5					IIIG,W,U
02			CULG				0026	0026.5					IIIG,W
	0000	0721	CULG	0031	0721								IS,W
			CULG				0248		1				IIIB
			CULG				0358						IIIB,W
			CULG				2022	2400					IIIN,W
	2022	2400	CULG	2022	2400	1	2022	2400	1				IS
			CULG	2128	2130	2	2128.5	2130	2				IIIG,V
			CULG				2136	2139					UNCLF
			CULG				2250	2251	1				IIIG,V
03	0000	0721	CULG			1	0000	0721	1				IS,DC
			CULG				0000	0721					IIIN,W
			CULG	0000	0721								IS,W
			CULG				0029.5		1				IIIB
			CULG				0053	0054	1				IIIG
			CULG				0437.5	0438.5	2				IIIG,V
			CULG				0607	0607.5	1				IIIG,U
			CULG	2021	2305								IS,W
	2021	2400	CULG				2021	2400	1				IS,DC
			CULG				2021	2155	1				IIIN
			CULG				2155	2400	1				IIIN
			CULG	2305	2315	1	2235	2400	2	2250	2400	1	CONT,SLOWD
			CULG				2307	2311					UNCLF
04			CULG				0000	0721					IIIN,W
			CULG				0000	0030	1	0000	0040	1	CONT
	0000	0721	CULG				0000	0035					IS,W
			CULG	0112	0113	1	0112	0113	1				IIIG
			CULG				0150	0151	1				IIIG
			CULG	0435	0436	1	0435	0436	1				IIIG
			CULG				2021	2305					IS,W
	2021	2400	CULG				2021	2335					IIIN,W
			CULG	2135	2400								IS,W
			CULG				2305	2400	1				IS
			CULG				2324	2327	1				IIIG,V
			CULG				2325	2400	1	2340	2400	1	IV
			CULG				2335	2400	1				IIIS
			CULG				2347	2355					II, W
05			CULG				0000	0135	1				IIIS
	0000	0720	CULG				0000	0720					IS,W
			CULG	0000	0720								IS,W
			CULG				0000	0245	1	0000	0245	1	IV
			CULG				0135	0720					IIIN,W
			CULG				0434.5		1	0434.5		1	IIIB
			CULG	0505.5	0507	1							IIIG
			CULG	0613.5	0614.5	1	0613.5	0614	1				IIIG
			CULG				2020	2400					IIIN,W
	2020	2400	CULG	2020	2400		2020	2400					IS,W
			CULG				2112.5	2114	1				IIIG,U
			CULG				2258.5	2300	2				IIIG
			CULG				2315	2316	1				IIIG
06	0000	0720	CULG	0000	0615		0000	0055					IS,W
			CULG				0000	0720					IIIN,W
			CULG				0013	0017.5	2	0013.5	0015	1	IIIG,V
			CULG				0040	0041	1				IIIG
			CULG				0055	0720	1				IS
			CULG	0224	0224.5	1	0224	0226	3	0224	0225.5	2	IIIG,V
			CULG				0335.5	0336.5	1				IIIG
			CULG	0421.5	0424.5	1	0421.5	0424.5	1				IIIGG

SOLAR RADIO EMISSION
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OCTOBER 1977

OCT 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
06			CULG	0424.5	0427	1	0424.5	0428	2	0425	0427	2	IIIGG,V
			CULG							0425	0426	2	IIIB,RS
			CULG				0430.5	0437	1	0432.5	0437	1	IIIGG
			CULG	0431.5	0443	1	0436	0600	1			IV	
			CULG	0433	0435	1	0432	0433	2				IIIG
			CULG							0433	0455	1	S.W.F.
			CULG				0434	0459	2	0501	0507	2	II
			CULG	0435	0443	1	0435	0443	1				CONT
			CULG				0458.5	0459	2				IIIG
			CULG	0500	0504	2	0500	0506	3	0500.5	0506	3	IIIGG,V
			CULG							0503	0513	1	S.W.F.
			CULG				0506	0512	2				IIIG
			CULG				0521	0521.5	1				UNCLF
			CULG				2020	2400					IIIN,W
	2020	2400	CULG	2020	2105		2020	2400					IS,W
07			CULG				0000	0400	1				IIIN
	0000	0720	CULG				0000	0720					IS,W
			CULG				0159	0200	2				IIIG
			CULG				0324		1				IIIB
			CULG				0331		1				IIIB
			CULG				0400	0720	1				IIIS
			CULG	0542.5	0543.5	1							IIIG
			CULG				0617.5	0618	2				IIIG
			CULG				2021	2400	2				CONT
	2021	2400	CULG	2021	2042								IS,W
			CULG				2021	2400	1				I IIS
			CULG				2026.5	2027	2				IIIG
			CULG	2042	2043	1	2042	2043	1				IIIG
			CULG				2151	2152	2	2151.5	2152	1	IIIG
			CULG	2351	2352	1	2351	2352	2	2351	2352	1	IIIG
08	0000	0719	CULG				0000	0719	1				IS,C,DC
			CULG				0000	0719	1				IIIS
	2020	2400	CULG				2020	2400	1				IS,C,DC
			CULG	2020	2400	1							IIIN
			CULG				2020	2400	1				IIIS
			CULG	2032	2032.5	1	2032	2033	3	2032	2032.5	3	IIIG
			CULG				2034.5	2039	2				UNCLF
			CULG	2034	2035	2	2034	2035	2				IIIGG,U
			CULG	2036.5	2037.5	2	2036.5	2038	2				IIIG,U
			CULG	2056	2056.5	1	2055.5	2056.5	2	2055.5	2056.5	2	IIIG
			CULG	2237	2237.5	1	2237	2238	3	2237	2238	2	IIIG
			CULG	2240	2241	1	2240	2241.5	3	2240.5	2241.5	3	IIIG
09	0000	0719	CULG				0000	0719					IS,W
			CULG				0000	0719	1				IIIS
			CULG	0152.5	0153	1	0152.5	0155	2	0152.5	0153.5	2	IIIGG
			CULG				0310	0311.5	2	0311	0311.5	1	IIIG
			CULG	0324	0329	1	0322	0329.5	2	0322	0329	1	IIIGG
			CULG	0339	0341	1	0336.5	0342	3	0337.5	0342	2	IIIGG
			CULG				0347	0349	3	0347	0349	3	IIIG
			CULG				0358.5	0400	2	0358.5	0400	1	IIIG
			CULG	0410.5	0411.5	1	0410.5	0411.5	2	0410.5	0411.5	2	IIIG
			CULG	0421	0422	1	0421	0422	3	0421	0422	2	IIIG,U
			CULG	0423.5	0425	2	0423.5	0425.5	3	0423.5	0425.5	3	IIIG,V
			CULG	0425.5	0427.5	2	0425.5	0428	3	0425.5	0428	3	IIIGG,V
			CULG	0454	0455	1	0454	0455	2	0454	0455	2	IIIG
			CULG	0516	0517	1	0513	0517.5	3	0516	0517	3	IIIGG
			CULG				0615	0616	2	0615	0616	2	IIIG
			CULG				2020	2400	1				N,RS,DP
			CULG				2020	2400	1				IIIS
	2020	2400	CULG				2020	2400					IS,DC,W
10	0000	0719	CULG				0000	0719					IS,DC,W
			CULG				0000	0719	1				IIIS
	2020	2400	CULG				2206.5						IIIB,W
			CULG				2217						IIIB,W
11	0000	0718	CULG				0510.5						IIIB,W

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OCTOBER 1977

OCT 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
11			CULG				0552						IIIB,W
			CULG				0701		1				IIIG,U
			CULG	0711	0712	1	0711	0712	2				IIIG
	2019	2400	CULG				2019	2130					IIIN,W,U
			CULG				2107	2108	1				IIIG,U
			CULG	2256.5	2257	1	2256	2258.5	3	2256	2258	2	IIIG,VU
			CULG				2349	2350	2	2349	2350	1	IIIG,U
			CULG				2357	2357.5	1				IIIG
			CULG	2359	2302	1	2259	2303	3	2359	2303	1	IIIGG,V,U
12	0000	0719	CULG				0000	0719	1				IIIN
			CULG				0005.5	0006.5	2				IIIG
			CULG	0022	0025	1							FAST DRIFT
			CULG	0026	0029	1	0026	0029.5	2	0028	0029	1	IIIGG
			CULG	0033	0040	1	0033	0040	2	0034	0039	1	IIIGG
			CULG	0041	0043	1	0041.5	0043	1				IIIG
			CULG	0147	0155		0147	0719					IS,W
			CULG	0150	0153	2	0150	0155	2	0150	0153	2	IIIGG,V
			CULG	0151	0205	2							CONT,P
			CULG							0152	0201	1	SWF
			CULG				0153	0217	2	0200	0217	2	II, HB
			CULG				0220	0719	2				IV
			CULG				0228.5	0229.5	2				IIIG
	2019	2400	CULG				2019	2340	1				IIIS
			CULG				2047	2129	2	2047	2155	2	IIIN
			CULG	2131	2400	1	2131	2400	1				IIIN
13	0000	0718	CULG	0000	0133	1	0000	0133	1				IIIN
			CULG	0345	0346	1	0344	0349	1				IIIG
			CULG	0420.5	0421								IIIG,W
			CULG				0555	0718	1				IIIS
			CULG				0639.5	0640.5	2				IIIG
			CULG	0643	0645	1	0643	0645	1				IIIG
			CULG	0705	0706		0705	0706					IIIG,W
			CULG	0709	0710	1	0709	0710	1				IIIG
	2018	2400	CULG				2018	2400					IIIS,W
			CULG				2140	2355	1				IIIS
14	0000	0718	CULG				0000	0718	1				IIIS
			CULG				0410	0718	1				N,RS,DP
			CULG	0442.5	0443								IIIG,W
			CULG				2018	2400	1				S,RS,DP
	2018	2400	CULG				2018	2400	1				IIIS
			CULG				2016	2400	1				N,DP
			CULG				2216	2217	2	2216	2217	1	IIIG
			CULG	2219	2221	1	2219	2223	2	2219	2221	1	IIIGG
			CULG				2319	2320	1	2319	2320	1	IIIG
			CULG				2332	2338					IS,W
15	0000	0719	CULG				0000	0718	1				IIIS
			CULG				0000	0718	1				S,RS,DP
			CULG				0046	0718	1				IS,DC
			CULG	0117.5	0119	2	0117.5	0119	2	0117.5	0118.5	2	IIIGG
			CULG	0123	0124.5								IIIG,W
			CULG				0242.5	0244	1				IIIG
			CULG	0315	0317	2	0315	0317	2	0315.5	0316	2	IIIG
			CULG	0448	0718								IS,W
	2018	2400	CULG				2018	2400	1				IIIS
			CULG				2018	2400	1				S,RS,DP
			CULG				2018	2400	1				IS,DC
			CULG	2124	2126	1							FAST DRIFT
16	0000	0719	CULG				0000	0718	1				IIIS
			CULG				0000	0718	1				S,RS,DP
			CULG				0000	0718	1				IS,DC
			CULG	0026	0027		0026	0027					IIIG,W
			CULG	0125	0718								IS,W
			CULG				2018	2400	2				IS,C,DC
	2018	2400	CULG				2018	2100	2				IIIS
			CULG				2018	2400	1				S,RSDP

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OCT 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
16			CULG	2018	2400								IS,W
			CULG				2100	2400	1				IIIS,C
17	0000	0717	CULG				0000	0717	1				IIIS
			CULG				0000	0717	1				N,RS,DP
			CULG	0000	0717								IS,W
			CULG				0000	0717	2				IS,C,DC
	2018	2400	CULG				2018	2400	2				IS,C,DC
			CULG				2018	2400	1				N,RS,DP
			CULG							2018	2400	1	IIIN
			CULG				2018	2200	2				IIIS
			CULG				2200	2400	1				IIIS,C
18			CULG				0000	0717	1				N,RS,DP
			CULG				0000	0717	1				IIIS,C
	0000	0717	CULG				0000	0717	2				IS,C,DC
	2017	2400	CULG				2017	2400	1				IS
			CULG				2017	2330	1				IIIN
			CULG	2026	2029.5	1	2026	2028	2				IIIG
			CULG	2032.5			2032.5						IIIB,W
			CULG				2116.5	2117	2				IIIG,U
			CULG	2120.5	2121.5	1	2120.5	2121.5	2				IIIG
			CULG				2129.5	2130	2				IIIG
			CULG				2147	2147.5	1				IIIG
			CULG				2159	2200	1				IIIG,U
			CULG	2247	2253	1							FAST DRIFT
			CULG				2250	2251	1				IIIGG
			CULG	2255.5	2256	1	2255.5	2256.5	1				IIIG
19	0000	0717	CULG				0000	0717					IS,W
			CULG				0001	0002					IIIG,W
			CULG	0337	0338		0337	0338					IIIG,W
			CULG				0629	0630	1				IIIG
			CULG				0633	0634	2				IIIG
	2017	2400	CULG	2017	2400		2033	2235					IS,W
			CULG				2027.5		1				IIIB
			CULG				2207						IIIB,W
			CULG				2235	2400	1				IS,C
20	0000	0717	CULG	0000	0717		0000	0717					IS,W
			CULG				0011		1				IIIB
			CULG				0043	0717					IIIN,W
	2017	2400	CULG				2017	2400	2				IS,C,DC
			CULG	2017	2400								IS,W
			CULG				2017	2210	1				IIIS,W
			CULG				2210	2400					IIIN,W
			CULG				2331	2332	1	2331	2332	1	IIIG
21			CULG	0000	0717	1							IS
			CULG				0000	0717					IIIN,W
	0000	0717	CULG				0000	0717	2				IS,C,DC
			CULG				0156	0158	1				IIIG
			CULG				0201.5		1				IIIB
	2017	2400	CULG				2017	2400	2				IS,C,DC
			CULG	2017	2400								IS,W
			CULG				2017	2215	1				IIIS
			CULG	2136	2138	1	2136	2139	2				IIIGG,V
			CULG				2215	2400	1				IIIS,C
			CULG				2327	2328	1				IIIG
			CULG				2336	2342	1	2337	2339	1	IIIGG
22			CULG				0000	0716					IIIS,W
			CULG	0000	0716								IS,W
	0000	0716	CULG				0000	0716	2				IS,C,DC
			CULG				0256	0257	2				IIIG
			CULG				0336	0337	2				IIIG
	2016	2400	CULG	2016	2400	1	2016	2400	1				IS
			CULG				2016	2300	1				IIIS
			CULG				2300	2400					IIIN,W
23			CULG				0000	0435					IIIN,W

SOLAR RADIO EMISSION
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OCTOBER 1977

OCT 1977	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
23	0000	0716	CULG	0000	0212		0000	0345					IS,W
			CULG				0036.5	0037.5	1				IIIG
			CULG	0335	0505								IS,W
			CULG				0345	0600	1				IS,C
			CULG				0435	0615	1				IIIS
			CULG				0600	0716	1				IS
			CULG				0612	0613.5	1				IIIG,V
			CULG				0615	0716					IIIN,W
			CULG				0659.5		1				IIIB
			CULG				2016	2400					IIIN,W
	2016	2400	CULG				2016	2400					IS,W
24			CULG				0000	0105					IIIN,W
	0000	0716	CULG				0000	0716					IS,W
			CULG				2016	2030					IIIN,W
	2016	2400	CULG				2016	2035					IS,W
			CULG	2229	2300								IS,W
			CULG	2250	2250.5	1	2250	2251	2				IIIG
			CULG				2323	2335					IS,W
25	0000	0716	CULG				0207	0625					IIIN,W
			CULG				0253	0540					IS,W
			CULG				0253	0254	1				IIIG
			CULG				0309	0309.5	1				IIIG
			CULG				0540	0716	1				IS,DC
			CULG				0545	0546	1				IIIG
			CULG				0625	0716					IIIS,W
			CULG	0642	0716								IS,W
	2016	2400	CULG										
26	0000	0716	CULG				0656	0657					IIIG,W
	2016	2400	CULG										
27	0000	0716	CULG										
	2016	2400	CULG				2016	2400	1				IS
			CULG				2132						IIIB,W
			CULG				2228	2229					IIIG,W
			CULG				2338.5	2339.5	2	2339	2339.5	1	IIIG,V
28	0000	0716	CULG				0000	0225					IS,W
			CULG	0041.5	0042.5	1							FAST DRIFT
			CULG				0041		1				IIIB
			CULG	0101.5	0102	1	0101.5	0103	1				IIIG,U
			CULG	0356	0357.5	1	0356	0357.5	1				IIIG
			CULG				0541.5	0544.5	1				IIIGG,V
			CULG				0553						IIIB,W
			CULG	0644	0645	1	0643.5	0646	3	0645	0646	2	IIIG,V
	2016	2400	CULG	2016	2330								IS,W
			CULG				2021.5						IIIB,W
29	0000	0716	CULG	0420	0500								IS,W
	2016	2400	CULG	2016	2240		2135	2400					IS,W
			CULG				2030	2105					IIIN,W
30	0000	0715	CULG	0125	0127		0000	0715					IS,W
			CULG				0506						IIIB,W
	2016	2400	CULG	2213	2241								IS,W
			CULG				2239.5						IIIB,W
31	0000	0715	CULG				0410	0417	1				IIIGG
			CULG	0411	0417.5	1							FAST DRIFT
			CULG				0416	0423.5	2				II
			CULG				0512						IIIB,W
			CULG	0543	0715		0645	0715					IS,W
			CULG				0637	0638					IIIG,W
			CULG	0644	0645	1	0644	0645	1				IIIG,V
	2016	2400	CULG	2022	2024.5	1	2022	2026	1				IIIGG
			CULG				2039.5	2046	1				IIIG
			CULG				2101	2125					IS,W
			CULG				2136.5						IIIB,W

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

OCTOBER 1977

OCT 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
31			CULG	2220		2	2220		2				IIIB
			CULG				2356	2359	2	2356.5	2357.5	1	IIIG

SELECTED SOLAR EVENTS

SEPTEMBER-OCTOBER 1977

Culgoora

UT Date 197.7	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
ADDITION									
September	Report								
			43.25)				3		
8	2239	2244	80)	1.1	130	-	3	IIIG,V	Complex source structure
			160)				2		
	2244	2349	43.25)	1.5			2	II	
			80)	1.4	90	-	2		
			160)	1.1			3	IV	
1977									
October									
3/4	2340	0011	43.25)	See			3)		Source moved out from $1R_\odot$ to 3 $R_\odot$ approx. Event began before start of observation.
			80)	remarks	105	-	3)	IVM	
			160)				2)		
4/5	2300	0122	43.25	1.4	130	-	2)	IV	Type II preceded observations
			80	(1.4	130	-)	)		
				(1.1)	120	R)	2)		
				(1.1)	155	L)	)		
			160	(1.1)	120	R)	)		
				(1.1)	155	L)	1)		
5/6	2300	0500	160)	1.0	130	R	1	I	This region persisted until 9th
			80)						
6	0224	0226	43.25)				3)	IIIG, V	§
			80)	1.0	340	-	3)		
			160)				2)		

Days without Heliograph observations: ..NIL.....

§ Other type IIIs observed at same position during the day.

SELECTED SOLAR EVENTS

OCTOBER 1977

Culgoora

UT Date 197.7 October	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
6	0421	0512	43.25 80 160	1.0	340	-	3	IIIG, V	Followed by complex type II
7	0159	0200	43.25 80 160	1.2 1.1 1.0	330	-	3 2 2	IIIG	§
8	0448	0452	43.25 80	.8	120	-	3 2	IIIG, U	§
9	0423	0428	43.25 80 160	.1	80	-	3	IIIGG, V	§
12	0032	0038	43.25 80 160	.9	0	-	3 3 2	IIIGG	§
	0147	0423	43.25 80 160	.9	0	-	3 3 2	IIIGG, V	Followed by Type II-IV
12	2327	2328	80 160	.8	340	-	1 2	IIIG	§
13	0344	0350	43.25 80 160	.8 .2	50 270	-	3 2 3	IIIG	§
12/13	2300	0500	160	.7	340	L	1	I	§ This region persisted until 14th
14/15	2300	0500	160	.5	8	L	2	I	This region persisted until 19th

Days without Heliograph observations: NIL

§ Other type IIIs observed at same position during the day.

SELECTED SOLAR EVENTS

OCTOBER 1977

Culgoora

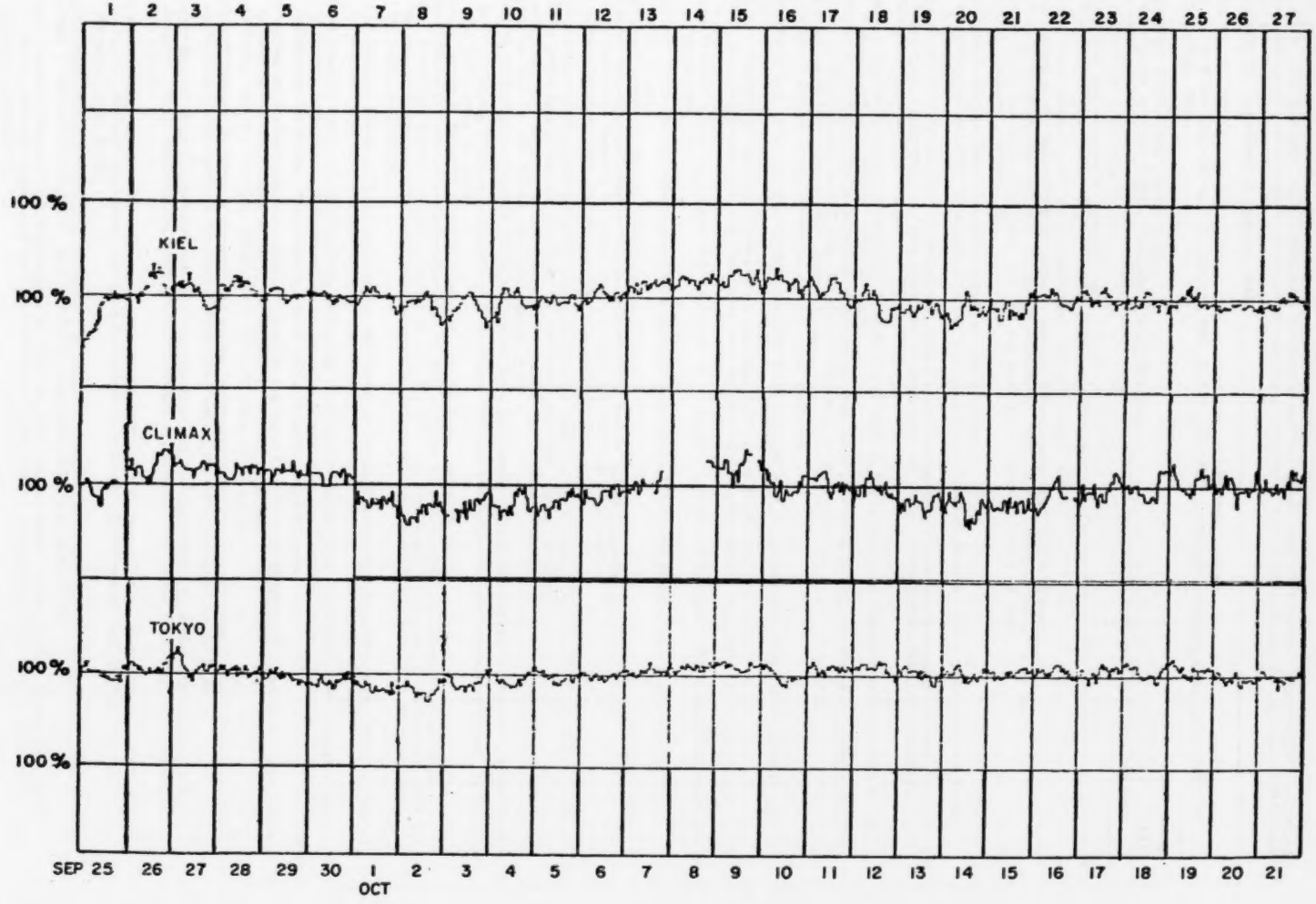
UT Date 197.. October	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
15	0117	0119	43.25) 80) 160)	1.0) .7) .5)	8	-	3	IIIGG	§
18/19	2300	0500	80) 160)	.8 .7	120	ℓ	1	I	This region persisted until 23rd
20/21	2300	0500	80) 160)	0	0	R	1) 2)	I	This region persisted until 25th
22	0256	0257	43.25) 80) 160)	.5	330	-	3) 3) 2)	IIIG	§
24	2250	2251	80) 160)	1.0 .9	290	-	3) 2)	IIIG	§
27	2338	2340	43.25) 80) 160)	1.3 1.2 1.0	60		3) 3) 2)	IIIG, V	§
28	0101	0102	80) 160)	1.2 1.1	300	-	1) 2)	IIIG, U	§
31	0410	0431	80) 160)	1.1 1.0	85	-	3) 2)	II	

Days without Heliograph observations: NIL

§ Other type IIIs observed at same position during the day

COSMIC RAY INDICES
Neutron Monitors

Bartels Rotation 1971 (September-October 1977)



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Misc
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